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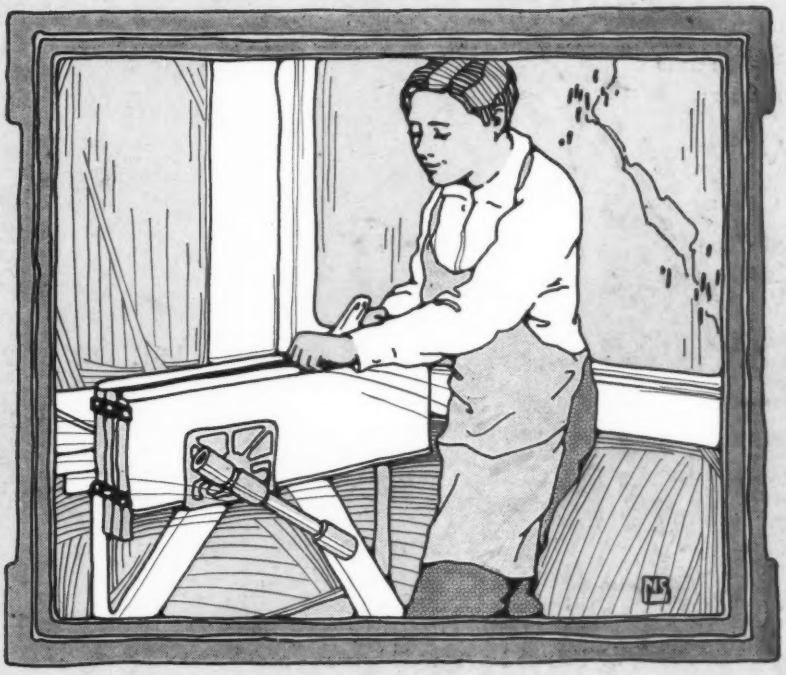

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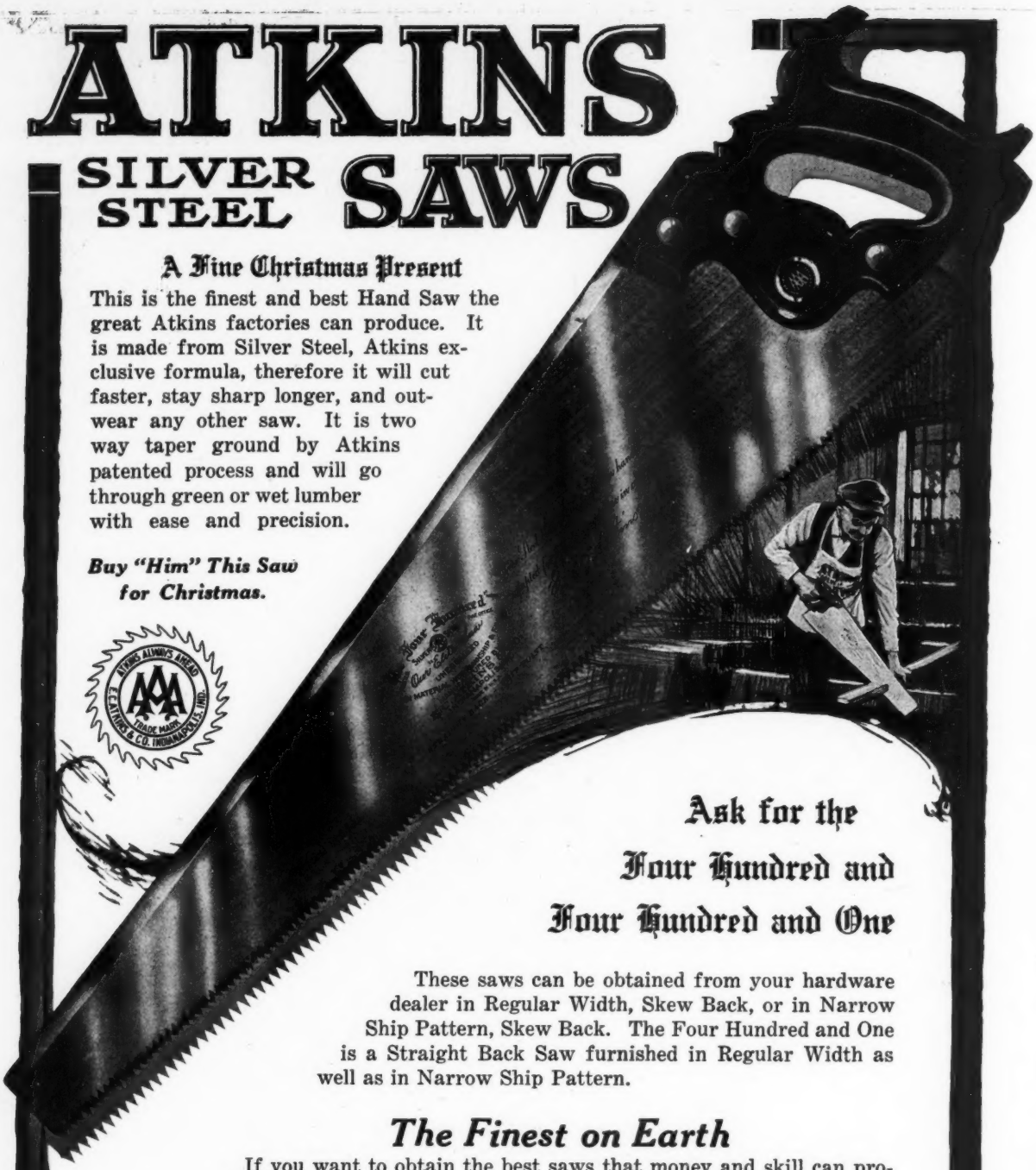

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THE INDUSTRIAL ARTS MAGAZINE

Volume XVI DECEMBER, 1927 No. 12

FRANK WIGGINS TRADE SCHOOL

A LOS ANGELES PUBLIC SCHOOL

C. A. Kunou, Supervisor of Manual Education, Los Angeles, Calif.

Historic Resume

LOS ANGELES was one of the first cities west of Chicago to introduce organized and systematic manual education activities in its elementary and high schools. It was in 1896 that these practical elements were introduced in the school curriculum. Since then the growth and development of this educational movement is recorded in fixed and distinct departmental features in the schools. These specialized features possess practical and educational identities of their own. Thus from the original, educational, practical idea, unfolded the advanced vocational idea for senior and junior high schools. From this latter sprang the specialized trade education idea fostered by federal and state plans and regulations including federal and state supervision and financial support. This specialized vocational idea with its educational possibilities was safely anchored to the moorings of a general education. A natural development of this idea was the further specialized training for specific trades in a school which was neither elementary nor of high-school type, instituted and organized as a part of the public-school system. It is in this latter development that the wisdom and foresight and educational vision of the present school administration is demonstrated.

THE FRANK WIGGINS TRADE SCHOOL, LOS ANGELES, CALIF.

In 1920 the local chamber of commerce called into conference representatives of industries of the city and at these meetings discussed programs and means for training men and women for industries. The chamber appointed a committee to cooperate with the board of education and the superintendent of schools in opening trade classes, and the first trade classes put in operation were in power sewing for garment workers. Thus the Frank Wiggins Trade School had its inception in temporary quarters established in different places of the city. In 1924 classes in dressmaking, millinery, beauty culture, advanced power sewing, linotyping, telegraphy, bricklaying, plastering, painting and paper hanging were organized. The second step in the development of the school consisted in the organization of classes in tile setting, sign painting, commercial art, and plumbing. The third consists in the establishment of classes in automotive repair instruction.

In March, 1927, a great structure, probably the largest public training plant in the United States for both men and women, was completed, and christened the Frank Wiggins Trade School, a Los Angeles public school. It has a floor space of about seven acres, and more than thirty distinct trades for both men and women are taught in this institution at the present time. The school is made up of two divisions: the Frank Wiggins Trade Day School and the Frank Wiggins Trade Evening School, both having the same objectives but differing slightly in practice. There are 52 competent, practically and professionally trained instructors in the day school and about the same number in the evening

school. The present enrollment in the day school is 1,200 men and women, and the total enrollment in the evening school, including trade extension classes, is 1,600 men and women. The fact that there are over 50 applicants on the waiting list for the day school shows the great demand for instruction and entrance at this school. Applicants are given consideration in the order in which they are received. Each applicant must appear in person and the enrollment into any particular class or department is conditioned by the applicant's ability to employ his training in the earning of a livelihood. The total cost of this ten-story building and its equipment is over $1,250,000, and of this large sum $250,000 or more were spent for equipment. The building and the architecture are planned to permit additions and extensions to the present building as the future may demand.

Organization

A survey of this school reveals a plan by which the elements of its organization fall under two heads:

a) The institutional or instructional.

b) The business or financial.

The institutional or instructional organization is made up by grouping all industrial activities in the school under certain trade-group heads. This grouping of related trades makes both instruction and organization efficient. The courses and activities are further divided under trades for men and trades for women.

Departments

It is not possible to present in this article an analytical description of every department in the school. The illustrations which accompany this article, however, give an idea of how some of the departments are equipped and what the courses contain. For the information of administrators, school officials, vocational directors, and teachers the following list has been added, showing departments, trade groupings, and related industrial activities.

Organization Plan of Day School

ART TRADES
Advertising Illustrating
Commercial Art
Interior Decorating
Show-Card Writing
Sign Painting

AUTOMOTIVE AND METAL TRADES
Auto Electrics
Battery Construction and Repair
Auto Mechanics
Auto Machine Work
Welding

BUILDING TRADES
Bricklaying
Cabinet and Furniture Making
Carpentry
Painting and Paper Hanging
Plastering
Plumbing
Sheet Metal
Tile Setting

DRAFTING TRADES
Architectural Drafting
Mechanical Drafting
Machine Design
Structural Drafting
Blue Printing, Electric

ELECTRICAL TRADES
Electricity, General
Electricity, Special Units
Electric-Elevator Operation
Commercial Telegraphy
Multiplex Telegraphy
Railroad Telegraphy
Telephone Switchboard Operation

FOOD TRADES
Cafeteria and Restaurant Cooking
Cafeteria and Restaurant Service
Pastry Making
Salad Making
Lunch-Counter Work
Soda Dispensing

PRINTING TRADES
Bindery Operations
Linotype
Monotype
Presswork, Platen, Automatic, Cylinder
Printing, Hand Composition

TEXTILE TRADES
Alteration of Women's Clothing
Dressmaking and Design
Millinery and Flower Making
Power Sewing
Pressing
Spotting

BEAUTY CULTURE, including Cosmetology and Hairdressing

JANITOR ENGINEERING, Operation of the Physical Plant.

For Men

Advertising Illustrating
Automobile Electrics
Automobile Mechanics
Automobile Machine Work
Battery Construction and Repair
Bricklaying
Cabinet and Furniture Making
Cafeteria and Restaurant Cooking
Carpentry
Commercial Art
Commercial Telegraphy
Electric-Elevator Operating
Linotype
Monotype Caster
Painting and Paper Hanging
Pastry Making
Plastering
Plumbing

CLASS IN TILE SETTING AT THE FRANK WIGGINS TRADE SCHOOL.

Pressing
Presswork
Printing, Hand Composition
Railroad Telegraphy
Show-Card Writing
Sheet Metal
Sign Painting
Spotting
Tile Setting
Welding

For Women

Advertising Illustration
Alteration of Women's Clothing
Beauty Culture
Bindery Operations
Cafeteria and Restaurant Cooking
Cafeteria and Restaurant Service
Commercial Art
Commercial Telegraphy
Dressmaking and Design
Electric-Elevator Operation
Millinery and Flower Making
Monotype Keyboard
Pastry Making
Power Sewing
Pressing
Salad Making
Show-Card Writing
Spotting
Telephone Switchboard

New Courses Organized

Architectural Drafting
Blue Printing, Electric
Electricity, General
Electricity, Special Units
Interior Decorating
Janitor Engineering
Lunch-Counter Work
Machine Design
Mechanical Drafting
Multiplex Telegraphy
Soda Dispensing
Structural Drafting

Demands already indicate that the following may be among the new courses planned:

Aeronautics
Baking
Barbering
Candy Making and Packing
Cement and Concrete Work
Cooky and Cracker Making
Jam and Jelly Making
Jewelry and Watch Making
Lithographing
Foundry Practice
Marine Drafting
Meat Cutting
Moving-Picture Occupations
Photography
Radio
Shoe Repairing and Making
Steam Engineering
Vocational Music
Upholstering of Furniture
Special Machine Shop

Organization of Courses in the Frank Wiggins Trade Evening School

BUILDING TRADES

Architectural Drawing

Cabinetmaking

Veneering
Machine Operation and Bench-work

Detailing and Stock Billing

Carpentry

Estimating
Construction
Roof Framing

Interior Decorating

Painting and Paper Hanging
Graining

Plastering

Plain and Ornamental
Bricklaying

Plumbing

Estimating
Layout
Lead-Joint Wiping

Sheet Metal

Layout and Shop Practice

ART TRADES

Art Metal, Copper, Brass and Silver
Art-Leather Work
Life Sketching
Sign Painting
Show-Card Writing
Floral Art
Interior Decoration

AUTO AND METAL TRADES

Battery Repair and Building
Auto Electrics
Automotive Theory
Automotive Engineering
Automotive Allied Machine-Shop Welding
Theory of Aeronautics

ELECTRICAL TRADES

Radio, Construction, Operation and Repair
Telegraphy, Commercial
Telegraphy, Railroad
Telephone Switchboard Operation
Motor and Generator Rewinding
Electrical Ordinances
Electrical Layout and Estimating
Theory of Power Generating Machinery
Slide Rule and Mathematics for Electrical Workers
Electric-Elevator Operation

TEXTILE TRADES

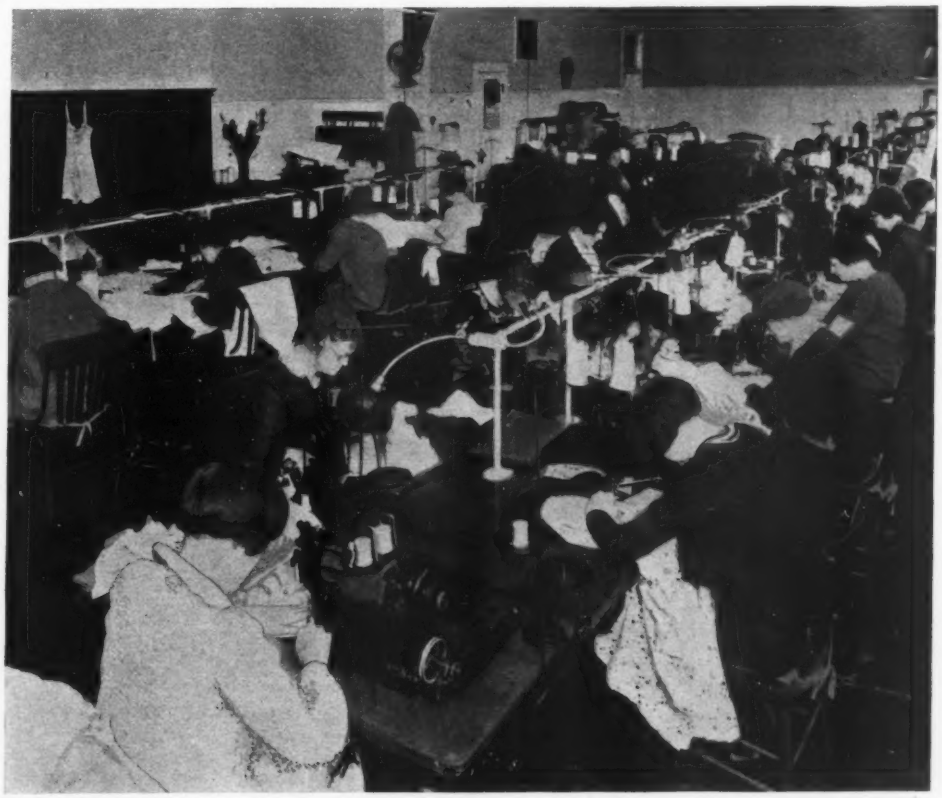
Dressmaking
Pattern Drafting
Costume Design
French Draping
Millinery
Tailoring
Alteration of "Ready to Wear"
Flower Making, Textile, Conventional
Floral Art, Realistic Flowers
Spotting, Cleaning and Pressing
Textile Chemistry

BEAUTY CULTURE

Manicuring
Facial, Electrolysis
Marcelling
Water Wave and Finger Wave
Permanent Wave
Hair Cutting
Theory and Science of Beauty Culture

DRAFTING TRADES

Architectural Drafting and Builders
Architectural Drawing for Design
Mechanical Drafting
Machine Design
Structural Drafting
Blue-Print-Machine Operation



TEXTILE TRADES—POWER SEWING, GARMENT WORKERS' CLASS. FRANK WIGGINS TRADE SCHOOL, LOS ANGELES, CALIF.

PRINTING TRADES

Hand Composition
Linotype, Keyboard Operation
Linotype, Mechanics
Monotype, Keyboard Operation
Monotype, Caster Operation and Mechanics
Presswork

In some of these groups of trades a general department head is appointed and it is expected that an instructor will act as subhead in each activity. The organization of the Frank Wiggins Trade School is operating in close unity with the revised California plan of trade and industrial education with its federal vocational education policy and further with the local board of education trade policy, as defined by that board of education. It is this successful organization and interrelation of the federal, state, and local control, supplemented by councils and advisory committees from local industries that makes this school a modern educational phenomenon. The local board of education feels that trade training should concern itself with the making of well-trained, civic-minded, mechanics, in such numbers that the students may reasonably expect employment in the community through such training. Trade training should be given, too, for the improvement of those already in the crafts. In the case of trade training in the public-school system the responsibility of the induction of those to be trained as skilled mechanics rests with the local board of education or its agents. This induction is on the basis of the applicant's personal fitness to profit by that training. Applications are given consideration in the order in which they are received without regard to race, color, creed, affiliations, or beliefs. The responsibility of selection of instructors, outline of courses of instruction, direction and supervision, instructional work and its continuance rests with the local board of education or its agents. The school officials representing the board of education seek advice and counsel in the fields of trade and industry with the privilege of using or discarding such advice without prejudice.

The California revised plan of trade and industrial education provides that all schools and classes in trade and industrial education operating under the state vocational education acts must meet the requirements of the revised California plan for vocational education. All industrial and trade classes established under the state and federal vocational acts with the purpose of receiving federal and state aid are under the supervision and control of the state and federal authorities, and reimbursement is given only for approved classes and instruction which meet the required standards. The purpose of the federal state board is to provide funds to reimburse the local committee for part of the salaries of teachers, to cut down cost of instruction to their districts, and to get definite work done. Further, the grade of instruction for which state and federal reimbursement is made must be less than college grade. When the local boards desire to receive reimbursement they must provide part of funds necessary to maintain schools and classes organized according to the California plan for vocational education. The types of trade and industrial education for which the California state board grants aid from federal and state funds are evening classes, part-time classes, part-time schools, all-day schools and classes. All of these are embraced under a policy of, first, trade extension; second, trade preparatory; third, cooperative part-time plans. The California plan further provides that the chief of the division

CLASS IN BEAUTY CULTURE AT THE FRANK WIGGINS TRADE SCHOOL.

A CLASS IN LINOTYPING AT THE FRANK WIGGINS TRADE SCHOOL.

of vocational education or state supervisor of trade and industrial education personally confers and advises with the school officials. The organization plan of this school further includes a coordination system by which the school, its teachers and students are brought into close relationship with the employers and industries of the city, and the school program is adjusted to meet the needs of the community. This coordination scheme includes a placement program, follow-up work, advisory-committee meetings, surveys, membership in commercial and civic organizations, meetings and discussions with individuals or groups from industries in order to keep the school in tune with the community's call for specialized workers.

The advisory committees are important. They consist of members appointed by the chamber of commerce and there is an advisory committee for each trade represented in the school. Each committee is made up of leaders in its particular trade. These committees meet as the need for their advice is required, and they have been an outstanding factor in the development of this trade school. The committees offer suggestions in the planning of courses of study, in matters of purchasing equipment, and sometimes these committees have equipped entire departments at their own expense. All of these committees work together with faith in the educational policies of the administration of the city. There are at present about twenty committees active in the school's organization and activities.

Advisory Committee and Number of Members

Alterations, 3 persons	Cabinetmaking, 13 persons
Automotive, 5	Tile Setting, 2
Beauty Culture, 3	Materials and Construction, 3
Bricklaying and Builders Exchange, 4	Merchants and Manufacturers Association, 1
Cafeteria, 3	Millinery, 5
Cleaning and Dyeing, 4	Painting, 5
Drafting, 3	Plastering, 4
Dressmaking, 3	Plumbing, 4
Electricity, 6	Printing, 4
Furniture, 1	Sheet Metal, 3

Telegraphy, 6 persons

The chairmen of these advisory committees meet at intervals forming what is called an advisory council that deliberates and gives general advice for the school as a whole.

THE FRANK WIGGINS TRADE SCHOOL, LOS ANGELES, CALIF.

MRS. SUSAN M. DORSEY
Superintendent of Schools, Los Angeles, California.

As head of the Los Angeles school system, Mrs. Dorsey will be official hostess to the A. V. A. convention held on December 17, 19, and 20, 1927. She has been active in school matters at Los Angeles as teacher, vice-principal, acting principal, assistant superintendent, and superintendent since 1896.

She is a graduate of Vassar College and member of many educational organizations.

The Frank Wiggins Trade School is a monument to her progressiveness.

The School Government and Administrative Staff

The Frank Wiggins Trade School, a day and evening school, is a Los Angeles free public school controlled by city school authorities:

Board of Education
Superintendent of Schools
Principal, Vice-Principal, Coordinator

The school is under the advisory and contributory supervision of the federal and state education authorities through the chief of the Bureau of Trade and Industrial Education of the state.

Enrollment:

The present enrollment in the Frank Wiggins Trade Day School is 1,200 men and women, and in the evening school, 1,600 men and women. On the waiting list for the day school there are over 500 applicants.

Business and Financial Organization of the School

This school is highly departmentalized and is similar to a great business institution. In order to permit the principal to utilize all his time and energy in a purely supervisorial and organizing capacity, the school has a business department under the supervision of a business secretary. The function of this department is: first, to control the financial operations within the school; second, to calculate production costs of products made within the school; third, to furnish data of the per-capita pupil cost; fourth, to collect statistics of the cost of operation of each department; and fifth, to establish and maintain a perpetual inventory of supplies and equipment in the departments.

In the accounting system the problems are: first, to find what is the cost of operating a department; second, to determine what it costs to turn out individual students. The business office acts as the business department of each individual industry within the school, as well as of the school as a whole. All purchase orders, interschool requisitions and job sheets are routed through this department.

Financial Statement

The per-capita cost according to average daily attendance in this school during its first year of existence is not indicative of what the figures may be in the future because the school is new.

The total cost of maintenance for the school year 1926-27 was $137,701, with an average cost per pupil of $229.90. These figures, according to the principal's report, will undoubtedly be reduced in future years when the school is expected to operate under more settled and normal conditions.

Public-Address System Instead of Auditorium

One of the features of the Frank Wiggins Trade School is the absence of an auditorium. The old auditorium plan includes the calling together of a large number of pupils, or the whole student body, on particular occasions and for general instruction. This requires pupils to drop classwork, clean up and don the proper habiliments, march long distances crossing yards and climbing stairs to reach an auditorium. When the assembly session is ended, they saunter back to their classrooms and again start their work. All this sauntering and waste of time is eliminated in this school. Instead of an auditorium, a modern up-to-date public-address system makes it possible to broadcast directly to the classrooms. Every room is equipped with a loud speaker and the principal at his desk broadcasts messages directly into the rooms. Upon the signal, "Teachers and pupils of Frank Wiggins Trade School stand by," work ceases and the students sit or stand at ease and listen to the message which the one in authority broadcasts. This method has been found to be much superior to the old auditorium plan. It includes also the feature of students working to music—and why not? Victrola connections have been installed so that students in every department may hear music or other radio messages directly.

A summary of the foregoing description will make it easy for visiting school administrators, vocational directors, teachers and others to follow up definite features when visiting the Frank Wiggins Trade School during the meeting of the National American Vocational Association in Los Angeles.

Summary of Description

1. History of the school.
2. Its organization, aims and objects; a free public school of neither high nor elementary type.
3. Government, administrative staff, and faculty.
4. The school's relation to the community and its social organizations, such as industries, chamber of commerce, labor unions, etc.
5. The Frank Wiggins building; its architecture.
6. The chamber of commerce, the superintendent of schools, assistant superintendent, vocational director and others connected with the making of the school.
7. The evening school, its classes, continuity and trade extension classes.
8. The coordination of the school and pupils with employers; students' adjustment, placement of students.
9. The coordination of school activities to the needs of the community. The school's advisory boards for men and women students. Student councils. Employers' committees and tradesmen committees.
10. The relation of the school to the state department of education, its supervision by the chief of the bureau of trade and industrial education of the state, and the school's conformity to state-aid requirements.
11. Part-time trade-extension classes.
12. Classes for students who have blind-alley jobs and are not prepared for skilled occupations.
13. The enrollment in day and evening school and the waiting list.
14. Financial; per-capita cost, etc.
15. No auditorium; radio service; public-speaking system.

PRESENT TREND OF INDUSTRIAL ARTS

Joseph C. Park, Director Industrial Teacher Training Department, State Normal and Training School, Oswego, New York

MARK SULLIVAN in *Our Times* points out that 25 years ago the word radio was not used; now nearly a thousand new words are used, because the radio has been invented. The technical terminology of the automobile, the tractor, the flying machine, the movies also have added thousands of words to our vocabulary, which were not known 25 years ago. Such terms as income tax, surtax, federal reserve system, chain stores, direct primaries, oil-burning engines on the seas, league of nations, world court, and the 16th, 17th, 18th, and 19th amendments were not known 25 years ago. Neither did we use such terms as bobbed hair, permanent wave, vamp, sheik, flapper, jazz, and rum-runner. We did not use the words bolshevism, fundamentalism, vocational guidance, behaviorist, Freudian, Nordic, complexes, Rotary, Kiwanis, cafeteria, sundae, mah-jong, cross-word puzzles, camouflage, and propaganda, nor the terms: Over the top, zero hour, no man's land, drive, boy scouts, state constabularies, traffic cops, traffic signals, and lip sticks.

Twenty-five years ago it had not been proved that yellow fever is transmitted by a mosquito, typhus by a louse, and bubonic plague by a flea. Insulin had not been used for diabetes, vaccination against typhoid was unknown, and radium for cancer had yet to be discovered.

In 1900 one could talk over a telephone a distance of 1400 miles, while in 1925 the radio made the human voice audible half-way around the world.

By increasing the power of the telescope and the microscope, by perfecting the motion picture, and by many other discoveries and inventions, man has enriched the outward reach of his senses, and has increased his knowledge of the universe. The perfection and extensive use of the internal-combustion engine is one of the most outstanding single achievements of the past 25 years, for by the use of this engine Byrd was enabled to fly over the North Pole between sunrise and sunset, and Lindbergh could traverse the Atlantic ocean in a little more than a day.

By the harnessing of streams for the development of electrical power and by the increased size of power units, man has increased his control over manufacturing and producing manifold. He has enriched his leisure, his comforts, his conveniences, and his luxuries. In the field of science alone the advances made during the past 25 years were greater than the sum of all the advances made in all time before.

Educational Leaders in 1900

Who were the greater American educators 25 years ago and what were some of their problems? Open the 1901 volume of the National Educational Association which gives the proceedings of the Detroit meeting of that year and you will find addresses by Angell, Vincent, Harris, Cooley, Parker, Skinner, Harper, Hall, Greenwood, O'Shea, DeGarmo, Russell, Faunce, and others.

In this 1901 report, 27 pages out of 1034 are devoted to manual training. The speakers were Mitchell, Curtis, Warner, Richards, Woodward, Gilbert, Morrison, and Belfield. They discussed "The Relation of Manual Training to Technical Education," and "Education for the Trades in America —What can Technical High Schools Do for It?" Charles R. Richards (p. 674), said among other things:

"From whence comes the demand for trade training? Who are the boys, and girls for that matter, that are to form the army of trade workers and who need such training under the present economic conditions? From an experience of ten years in trade-school work, my answer to this is that they are the boys below and outside of high-school possibilities. They are the boys and girls that must become wage earners directly after the compulsory school age. It is these, and these only, that form.....the great bulk of the manual workers of the country."

Calvin M. Woodward also gave a very inspiring address. We quote the following (from p. 677):

"This problem in regard to the trades is being solved in every community where the manual-training high school exists.... I believe we are meeting, and are destined to meet, the demand for artisans much more fully than he (Mr. Richards) seems to think. I have immense faith in the ultimate success of manual training to meet all our industrial wants, but the number of manual-training schools must be greatly increased. The doors must be open to every boy who reaches the age of fifteen and who desires it."

It must be remembered that in 1900 the industrial-education movement was receiving considerable attention, both pro and con, as indicated by the remarks of Richards and Woodward. To fully appreciate what Richards and Woodward said on this occasion one needs to imagine educational conditions as they existed in 1900. The growth in industrial work from 1890 to 1900 was quite remarkable as indicated by Richards. Quoting from a paper which was given in 1908,[1] we note the following:

"The past score of years has been a period of remarkable growth for the cause of manual training. In 1890 only 37 cities included manual training. In 1894 the number had increased to 95, in 1896 to 121, in 1898 to 146, in 1900 to 169, in 1901 to 232, in 1902 to 270, in 1903 to 322, in 1904 to 411, and in 1905 to 420."

Again we note from the quotations selected from Richards and Woodward, that Woodward was a strong advocate of the manual-training or technical high school which Richards claimed would not solve the problem of adequate industrial training for the great mass of workers. Richards had a far-reaching vision and in his address 25 years ago, if we read between the lines, he stated a problem and a prophecy that is being fulfilled in our work today. The Park and Harlan[2] survey made ten years ago showed significant facts as to aims, nature of work, time given to the various subjects, methods employed, and disposal of products. Since this survey great progress has been made in industrial education.

Educational Leaders in 1925

Let us go forward 25 years and open the 1926 Year Book of the National Education Association. Among the more prominent leaders of educational thought in 1926 we note the following: Kilpatrick, Bagley, Dewey, Thorndike, Russell, Judd, Buckingham, Gates, Charters, and a long list of other educators quite as prominent. Few of the great leaders of 25 years ago are with us today. Change is constantly with us. We cannot be static.

Education, including industrial-arts education, is conducted more scientifically today than it was 25 years ago. As time goes on we may assume that it will be still more scientific. According to Wiggam,[3] "Science is the effort to find out what to do with the universe, and what to do in the universe." Obviously this cannot be done except through education and through industrial education to a very large extent. If we have not yet reached the ideals of scientific education, we have at least reached a scientific attitude of mind whereby we deal more effectively with these problems.

For a number of years efforts have been made to get at the facts showing the need for industrial education. Very valuable studies have been made along this line, and, as a result of these studies vocational education is meeting the needs of boys and girls now more than ever before. In other words, in the matter of industrial education, we are approaching scientific ideals. Coulter says, "The ideals of science are: First, to understand nature; second, to apply this knowledge to the service of man, that his life may be fuller of opportunity, and third, to use the method of science in training man, so that he may solve his problems and not be their victim." Certainly this is exactly what is being accomplished by industrial-arts education today. Progress in this line up to 25 years ago was incidental. Today our work shows telic progress, i. e., progress that is the result of thought, of planning, of overcoming difficulties, and of adapting the individual to the world of action in which he lives.

Twenty-five years ago there were only a few schools in the United States doing any form of industrial-arts work; now almost every child going through the public schools comes in contact with more or less art and industrial-arts work. Do we feel the influence of this work in the lives of 26,000,000 boys and girls who were born less than 15 or 16 years ago? We are inclined to answer this question in the affirmative, yet we might find difficulty in proving the facts. Certainly our homes are better, more comfortable, more happy, more prosperous than they were then. Seldom do we read of a boy "running away from home" today. Yet this was quite common in early times because shared relations were less in olden times than today. Shared relations are necessary for educational advancement.

The Junior High School

The junior high school which is having such a rapid growth, provides in its curriculum a wide range of industrial activities. Pupils are allowed to take exploratory courses which include general science, electricity, metal shop, woodshop, printing, and other courses for the boys, and such courses as sewing, cooking, millinery, and budget making for the girls. These courses are not given as trade training, but as a means of helping the pupil to find out what interests him and what he is best fitted to do. Not only is craftwork provided, but commercial work, history, geography, and certain other work on general subjects. A distinctive feature of this new type of school is the time and work devoted to socializing activities. As an example: Club work is supervised by teachers, but the work is done largely by the pupils.

Our work today is dominated by the seven principles of education which are: (1) Health. (2) Mastery of fundamentals. (3) Worthy home membership. (4) Vocation. (5) Citizenship. (6) Worthy use of leisure. (7) Religious and moral training. These seven principles are the ruling purposes of human life. They are the points of contact and interaction between the individual and the world of action in which he lives. "What am I going to do and be?" is the great question that confronts every growing individual. This question and the answer to it is the basis of our work in vocational guidance. If young people are to be helped in this great problem it is essential that they be informed as to how they can best prepare themselves through proper schooling for life and for work. Certain occupations are overcrowded and certain occupations require special training and special aptitudes, possibly. The development of the junior high schools, an intelligent and wise use of educational measurements, a study of occupations, and an understanding of social problems are all factors which stand out conspicuously in the trend of present-day education.

If we study the listed aims of the junior high school we shall find much weight given to industrial arts. Friese in his "Exploring the Manual Arts," pp. 41, 42, records three commonly accepted manipulative aims:

"1. To provide opportunities for boys to make and do things they like to make and do.

"2. To provide training in common skills everyone should possess.

"3. To provide trade exploratory or tryout experiences in typical trades to assist boys in finding and testing their interests and aptitudes."

[1] J. C. Park, address before the Eastern Manual-Training Association, Washington, D. C., April 14, 1908.

[2] "Some Facts Concerning Manual Arts and Homemaking Subjects in One Hundred Fifty-Six Cities." By Joseph C. Park and Charles L. Harlan, Bulletin, 1916, No. 32, Government Printing Office, Washington, D. C.

[3] *New Decalogue of Science*, p. 115.

Friese also records the following five justifiable and achievable nonmanipulative aims:

"1. To provide training in industrial art and industrial-art appreciation (partially manipulative).

"2. To provide a natural medium for guidance, educational and vocational.

"3. To provide interesting technical information about the occupation or occupations represented in the school shop and others closely allied.

"4. To provide studies in vocational economics closely related in everyday life.

"5. To provide organized training in reasoning and problem-solving."

Life is a series of choices. The richness of a life is in direct proportion to the degree in which intelligent choices are made. According to Klapper, man is a lazy animal. If this is true, man will naturally choose an occupation where the work will be easy for him. No doubt the choice of an occupation where easy work is the basis of selection, is one of the chief causes for gross inefficiencies in all occupations. The choice of an occupation should take into account the requirements of the work on the one hand and the native ability and training of the prospective worker on the other hand. In industry today, a job is that for the doing of which a man is paid. Vocational analysts have attempted to classify jobs on the basis of physical and mental requirements. Occupations have been classified as neutral, constructive, and destructive. Labor has been classified as skilled and unskilled. But to assist one in making a choice, other, and perhaps greater factors which belong to the field of vocational guidance, should be considered.

Summary

If I were to point out specifically the present trend of industrial-arts education by way of summary, in the light of what I have already said, it is this:

1. There is a tendency to recognize the importance of individual differences, both native and acquired, as contributory causes in the successes and failures of individuals. This influence is felt in providing a wide range of industrial activities along with academic work.

2. More consideration is being given to the importance of occupational studies in order that the school may the better shape its curriculum to the needs of pupils who at an early age enter wage-earning occupations.

3. Greater consideration for adjustments of individuals to society. Let us teach them to *"know what to do with the universe and what to do in the universe."* This is probably one of the greatest problems of our social institutions, especially of the school. Because of changing conditions, our subject matter is constantly changing, as indicated by Mark Sullivan. Our industrial-arts work centers about food, clothing, shelter, tools, implements, amusements, and other activities. The "project" has taken the place of the "model." The present trend of industrial arts in this direction is to deal with the radio, the internal-combustion engine, and with problems involving subject matter closely related to the lives of the pupils *here* and *now*. Hence, change, constant change.

Our changing vocabulary referred to at the beginning of this article, is from the nature of things necessary. Terms used today may not be used tomorrow, yet we do know that truth stated by the masters lives on. Sayings from such men as Dante, Shakespeare, and Charles W. Eliot live through the ages. The only thing that does not change in the learning process is the Laws of Learning. These laws are constant.

4. Industrial teachers are being better prepared by teacher-training institutions than formerly. Industrial teachers must know the literature and best practices that have been developed.

5. By scientific investigations the work in industrial-arts courses is being better adapted to the needs of the pupils than formerly.

6. The work in industrial-arts and vocational education is generally recognized by all classes as being essential to the development of great masses of people who need this type of education. We no longer have to argue for this work. The people demand it. They will have it.

7. Industrial arts as we know it today helps to play the part of Columbus to the undiscovered talents and opportunities of youth. It should always seek to be the explorer of talent and opportunity. This is equally true of every phase of educational endeavor. Modern school management makes provision for school doctors and nurses, playgrounds, school shops, kitchens, laboratories, home visitors, vocational advisers, and extracurricular activities to help give boys and girls a good start in life. Hundreds of new professions and trades and occupations which have developed through inventions, rapid transportation, growth of cities, world markets, and travel, have forced the schools to provide much industrial and vocational training.

The industrial-arts teacher today has a tremendous opportunity and a great responsibility. He must not only know how to build his line of projects with efficient results but he must be well posted on what his pupils are thinking about and doing. For example, when the boys bring up the subject of aeroplanes the teacher should be able to tell them that aeroplanes in the United States last year flew five million miles,[4] and carried 205,000 passengers, and 112 tons of mail. Or, if a person commits suicide in the town and the boys are talking about it, the teacher should be able to suggest some cause and some remedy for the 16,000 people who took their lives in the United States in 1925. The teacher should be able to talk with the boys about traffic tangles, the vibrationless Buick, gum-dipped Firestone balloons, and the noiseless, jarless, frictionless glide of the Franklin. He must understand their vocabulary. He must change their vocabulary when necessary.

Finally, our great problem as teachers is for us (*a*) to be well grounded in our aims and purposes, (*b*) to know the best prevailing practices, and (*c*) to have a well-formulated outline of our work which will include projects with necessary related information, facts about materials, a knowledge of equipment, and the best methods of procedure.

Let us not fail in discipline. We say we develop the initiative of our pupils. I hope we do. But let us remember that the initiative of a child is more unsocial than social. *He wants adventure; he needs discipline.* The pupil must be led to feel his responsibility in the learning process or in unlearning that which is not good. Morrow[5] says:

> "Adventure—discipline! The two words go hand in hand. From Marco Polo and Columbus to Perry and Byrd, from Pocahontas to Helen Wills, from Shakespeare to Kipling, from Rosa Bonheur to John Sargent, self-control, self-denial, self-discipline have been the base on which achievement has been reared."

[4] *Aircraft Year Book*, 1926.
[5] *Cosmopolitan*, November, 1926, p. 214.

Vocational Education Should Commence Early

Men must keep abreast of the times. Schools have a definite thing to accomplish in preparing men in the various branches of industry. The training of men in the trades should be begun in their earlier years for most satisfactory results. The school must train boys in the best way possible for the market. Competition in the market is keen and boys must be "sold" to their employers.—*E. J. Sunderland.*

Evening Schools Add to Man's Happiness

Men are wanted in the evening schools because the training given adds to their happiness. The man who is happy at his work is the man who is valuable to society. There is often discontentment in the trade or industry because men are not sure of themselves, and because they have not had adequate training to meet the demands made upon them by industry. —*I. B. Morgan.*

HOW TO USE THE QUESTION IN TEACHING THE INDUSTRIAL ARTS

A DIAGNOSTIC METHODS STUDY

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Part I

QUESTIONING plays an important part in the daily instruction of students in the intermediate grades and the high school. A large share of the school day is devoted to the asking and answering of oral and written questions of various kinds in the several subjects included in the curriculum. Effective questioning on the teacher's part contributes largely to efficient teaching. Intelligent answering on the student's part is conversant with his educational growth and development.

1. Purpose and Aims of the Study.

This study is an inquiry into, and evaluation of the use and efficiency of, the question-and-answer form of recitation with reference to the teaching of manual and industrial arts in the intermediate grades and the high school. It is the result of a need felt for scientific studies of methods to determine their relative value and place in teaching the above-named arts.

2. Scope.

Because of lack of time this study was confined to just four industrial-arts subjects. No attempt was made to study job-sheet, lesson-sheet, or instruction-sheet questions. Nor was any effort made to study the best methods or processes of doing a certain piece of work so as to obtain the best results as far as the material product is concerned. In brief, the instruction, and not the construction methods of the class periods were studied.

3. Methods of Conducting the Study and Sources of Information.

Two methods were used to secure data and information: (1) A series of lessons was taught according to a detailed lesson plan, the verbatim accounts of which were afterwards studied, analyzed, and tabulated. (2) The writer appeared in person in several classrooms on different occasions and wrote down verbatim accounts of the instructor and student activity that occurred during the lesson period.

PART II

Material or Data Gathered:

a) A complete report of one lesson is given showing, (1) teaching conditions, (2) questioning and answering activity.

Grade: 9B. Approximate age of students: 15 years. Number present: 28.

Course of study in which the lesson was given: Technical.

Total time devoted to the lesson: 40 min.

Length of class period: 90 min.

Subject: Patternmaking.

Teaching Conditions: The class already had 14 weeks of joinery, woodturning, and foundry practice.

Outline of Topics Considered:

1. The green sand core.
   - *a)* The use of green and dry sand cores.
   - *b)* The limits to which the green sand core may be placed.

Immediate Aims of the Lesson:

1. To illustrate and describe green and dry sand cores.
2. To teach the advantages of using green sand cores.
3. To give a knowledge of the conditions which limit the use of these cores.

The Verbatim Report of the Lesson as It Took Place Is as Follows:

NOTE—The abbreviations I. and S. are used throughout this report to indicate instructor and student.

I. I am going to give you new work today and want to see how you carry it through after this demonstration. All the patterns you have made so far have been solid. Those of you who have had machine-shop work have drilled holes with a drill press. Holes in castings are made by making patterns with cores. Today we shall take up the "hook-up link." (Illustrative material used here was a sample pattern of a link.) This link is a part of an engine equipment. The subject under discussion is the green sand core. The first thing to consider is how to remove the pattern from the sand; therefore, the subject of draft is very important. The draft on the inside is twice that on the outside. This rule holds throughout the course. This link is made from a piece of wood (rough) 1⅛ by 2⅜ by 7½ in. The first thing to do is to plane the wood 1 in. thick. The wood, you know, is almost 1 in. thick now. Plane a little off each surface then govern yourselves accordingly. Every act of yours, boys, should have a thought back of it.

The bottom of the core is larger than the top in order to remove the pattern from the sand. The size of the wood is 2⅛ in. Draw circles on each side. The centers of the circles are the centers of the inner circle, otherwise concentric circles. What are concentric circles?

S. Circles with equal centers.

I. Is there any question before we go farther?

S. What is the draft on a pattern?

I. Draft on a pattern is the taper on the sides to allow the pattern to be removed from the sand. All patterns must be drafted. Why do we draft patterns?

S. Because the sand would cave in if no draft was allowed.

I. What is the size to plane this wood?

S. 1 by 2⅛ by 7 in.

I. What do we do after planing?

S. Get the centers.

I. How do we find the centers?

S. Set gauge and reverse wood until gauge marks fit each other.

I. Which side do we gauge?

S. Both faces 1 and 4.

I. How far is it from center to center of outside circles?

S. 4 in.

I. What is the size of the outer circle?

S. 1 in. (wrong).

I. What is the size of the outer circle?

S. 2⅛ in.

I. What is the size of the smaller circle?

S. 2 in.

I. What is the size of the larger hole?

S. 1 in.

S. Why is a pattern put in sand?

I. How else could we shape it unless we had something like it, unless we had a model of it? Every machine or machine part at one time has had a pattern made of it. Is there anyone else who does not understand now what he is supposed to do?

S. Why is one side 2 in. and the other 2⅛ in.?

I. Someone set this boy right on that.

S. To allow for draft.

I. We have 5 minutes left to start this work. I shall give each boy a piece of wood and expect you to do what you can with it during that time.

b) Excerpts from the Material Collected:

I. I desire to call your attention, boys, to these buzzers. I am having enough of these wooden blocks made in the woodworking classes so that each one of you can construct a buzzer.

Harris, have you any idea what this particular instrument is I hold in my hand?

S. (Harris) It is a lock that goes on a door.

I. Coss, have you any idea what it is?

S. (Coss) I don't know what it is.

I. What is this, Jackson?

S. (Jackson) It is a thing that goes on a door that holds it shut.

I. That is not the name for it. What is the correct name for it?

S. (Volunteer) It is an electric door opener.

I. How many have had an opportunity to open one of these? (5 raised hands.)

I. Inasmuch as this is a circular pattern involving circles, we are going to lay it out on the blackboard. This distance across is $3\frac{1}{16}$-in. diameter. What would be the radius?

S. (1) $\frac{5}{16}$ in.

(2) $1\frac{17}{32}$ in.

I. Set your dividers to $1\frac{17}{32}$ in. and make a circle $3\frac{1}{16}$-in. diameter. The next circle to draw is $\frac{29}{32}$-in. diameter.

What is the half of $\frac{29}{32}$ in.?

S. $\frac{15}{16}$ in.

I. How many say that is correct? (Some disagreed.) How much greater is $\frac{5}{32}$ in. than ¼ in.?

S. $\frac{1}{32}$ of an inch.

I. Half of ¼ is what?

S. ⅛.

I. Any questions on this? (No responses.) Then let me ask some. If it were possible to make all poles north poles or all south poles would this apparatus be as efficient?

S. No.

I. What is the object in having alternating current?

S. It is stronger. It builds up a stronger magnetic field.

I. Describe the current that comes out of the plug.

S. I don't know.

S. It is 18-volt alternating current.

c) Examples of questions used:

What is meant by shrinkage?

How is contraction provided for?

Is ¼ in. to the foot used on every metal?

Why is it necessary to have 2 projections on this pattern?

How do you know there is to be finish on a pattern?

Why is the face of an independent chuck graduated?

What care should be taken when reversing the jaws of a chuck?

On what kind of work can an independent chuck be used to best advantage?

Between what points do we find the magnetic field?

Which way do the lines of force run?

What is the object in having alternating current?

What sort of magneto is the Ford magneto called?

d) Examples of Examination Questions Asked:

Auto Mechanics, 9B

1. Fill in valve operations on chart, Figure 1.
2. Explain why an advanced spark gives more power at high speeds.
3. Explain why an engine starts pumping oil (causes).
4. What remedy is there for an engine that pumps oil?
5. Explain three types of engine-lubricating systems.
6. Describe two kinds of water-cooling systems, and tell how each works. (Sketches if desired.)
7. Name:
   - *a)* 3 types of transmissions.
   - *b)* 3 types of clutches.
   - *c)* 4 kinds of rear axles.
   - *d)* 5 kinds of springs.
8. Describe the process of adjusting the bearings of a 4-cylinder car under the following headings:
   1. Preparation.
   2. Actual adjustment.
   3. Precautions in assembling.

Electrical Work, 9B, Second Semester.

1. What is a transformer and what is it used for?
2. What is a rheostat used for?
3. What is meant by a.c. and d.c.?
4. Name six applications of the electromagnet.
5. Figure cost of running a motor on city current drawing 2 amperes for 6 hours at 6 cents per kwh.
6. Explain the action of an arc light.

Table 1.

This table shows questioning technique and kinds of questions asked.

Lesson No.	Subject	Grade	Questioning Technique Used: Questions directed to: Class	Questions directed to: Individuals	† Distribution: Number of students questioned	† Distribution: Number of students in class	Unnecessary Repetition: Questions	Unnecessary Repetition: Answers	Kind of Questions: Memory	Fact	* Auxiliary	Yes or No	Total	Percentage of each type of question: Memory	Fact	* Auxiliary	Yes or No
1	P.M.	9B	9	1	11	28	1	0	10	0	2	0	12	77	0	23	0
2	P.M.	9B	19	1	13	28	1	0	8	5	7	0	20	40	25	35	0
3	M.S.	10B	10	0	Each pupil given an opportunity to recite		0	0	4	5	1	0	10	40	50	10	0
4	M.S.	10B	11	0			0	0	7	0	4	0	11	64	0	36	0
5	E.	9B	5	5	6	26	0	0	6	0	0	4	10	60	0	0	40
6	E.	9B	11	8	8	29	3	2	8	0	0	11	19	42	0	0	58
7	A.M.	9B	19	0	9	19	3	1	8	4	5	2	19	42	21	26	11
8	A.M.	9B	4	0	5	20	1	0	3	0	0	1	4	75	0	0	25

* Abbreviations used: P.M.--Patternmaking. M.S.--Machine Shop. E.--Electrics Work. A.M.--Auto Mechanics.
† Means that eleven of the 28 present did all the reciting.
‡ For example: Are there any questions on this point?

Table 2.

Showing Pupil Activity in Terms of Reactions to Questions.

Terms of Reactions / Subject / Lesson No.	P.M. 1	P.M. 2	M.S. 3	M.S. 4	E. 5	E. 6	A.M. 7	A.M. 8	Totals	Per Cent
1. Details of Construction. (a) Dimensions, sizes, use, and description of tools, etc.	8	8	0	0	1	0	0	0	17	15
2. Related Subject Matter. (a) Definitions, explanations and classifications.	0	0	6	6	5	13	8	4	42	37
(b) Descrimination between two easy choices.	0	0	0	0	0	3	0	0	3	2.6
(c) Called for personal opinions.	0	0	0	1	0	0	0	0	1	.87
(d) Notes obtained through library or home study.	0	0	0	0	0	1	0	0	1	.87
(e) Understanding of facts acquired. 1. From previous lessons. 2. Generally.	2	10	10	5	0	0	6	2	35	31
3. Answers to "Why" Questions.	0	1	0	1	0	0	1	0	3	2.6
4. With Words "Yes", "No," or "I don't know."	0	1	0	1	1	1	5	0	9	8
5. By Counter Question.	1	0	0	0	0	0	0	0	1	.8
6. By Instructor.	1	0	0	0	0	0	1	0	2	1.7
7. Odd Statements or Peculiar Answers.	0	0	0	0	0	0	0	0	0	0
Totals	12	20	16	14	7	18	21	6	114	100

PART III

Summary of Findings

1. Technic displayed in questioning.

a) Questions did not always challenge attention, hold interest, and stimulate mental reaction in the entire group. Instances occurred of naming the student before stating the question. In brief, all in the class were not on the qui vive all the time.

b) Questions were unevenly distributed. Each member of the class was not given an opportunity to express himself. While in no case was any seemingly predictable order of asking questions used, on the whole the minority in the class were active while the majority were passive. The approximate percentages in general vary from two thirds to three fourths of the total number present. Specific instances show that in Lesson 1, 61 per cent did not recite; Lesson 5, 77 per cent; Lesson 6, 73 per cent; and Lesson 7, 53 per cent.

c) Unnecessary repetition of questions and answers occurred in half the lessons reported.

2. Purpose of the questions.

a) The use of the question lacked breadth of purpose. Its use was limited to testing the powers of memorization and the understanding of acquired facts and knowledge. Out of a total of 113 questions asked in the 8 lessons, 47 per cent were memory, 18 per cent fact, 18 per cent direct, and 17 per cent auxiliary.

b) No use was made of the question for the purpose of (1) stimulating independent thought and action, developing judgment, reasoning, self-activity, or for inculcating sense of power in students, (2) developing subject matter in logical sequence.

3. Students questions.

a) A minimum amount of real interest or serious thought was displayed by students as shown by, (1) the small number of questions they asked, (2) the kind of questions asked.

b) The questioning attitude on the students' part was not always encouraged.

4. Reactions or answers.

a) The tendency in some cases was to emphasize the finished material product rather than to stress pupils' development, their psychological needs, interests, and abilities. This is revealed in answers given in terms of details of construction, and the undue emphasis placed on defining and explaining. This also suggests that questions directed attention away from the major parts of the lesson to its minor details of construction which should be left for pupils to study from the drawing or sketch during the laboratory period.

b) The pupils' personalities, or own individual reactions, were not behind the answers as revealed in the number of answers in terms of previously acquired facts.

c) The brevity of a number of the answers suggests that the given questions called for off-hand use of judgment and no real thinking, also that a limited training in oral expression was afforded.

5. Examination and Test Questions.

Written questions were chiefly tests of past instruction. No attempt was made to go beyond the known facts possessed by the students to secure reactions in terms of good judgment or reasoning ability.

6. Instructor vs. Student Activity.

The tendency was for the instructor to do most of the work rather than to direct the students in the doing. This suggests that the methods of instruction used were those of "pouring in" or lecturing, rather than those of "drawing out" or developing.

Table 3.

Showing comparative percentages of instructor and student activity as measured in words spoken.

Lesson Number	No. of Students Present	Number of Words Spoken by Instructor	Per Cent	Number of words Spoken by Students	Per Cent	Average Words Per Student	Total Words Spoken
1	28	327	84	71	16	3	398
2	28	690	83	141	17	5	831
3	20	98	40	146	60	7	244
4	18	107	34	206	66	11	313
5	26	307	83	65	17	3	372
6	29	378	79	105	21	4	483
7	19	806	71	328	29	17	1134
8	20	181	60	119	40	6	300

Discussion

The unnecessary repetition of questions and answers has been generally attributed to habit. In some cases, however, repeating was used as a means of "pumping" an answer from the student while in others the instructor wanted to be sure the student understood the question. Sometimes the instructor merely failed to consider whether or not repeating was justified in each particular case.

A direct relation exists between the ultimate or general educational aims or objectives of the subject, the immediate aims or objectives of the lesson, and the teaching method or methods used. If the general objectives or values, which may reasonably be expected to be attained as a result of well-organized and carefully taught shop and drawing courses, are the development of certain appreciations, interests, judgments, habits, attitudes, initiative and constructive tendencies, and the immediate aims of a lesson in patternmaking, for example, are to foster the spirit of independent action to teach the advantages in using green sand cores, and to give a knowledge of the conditions which limit the use of these cores, then both the ultimate and immediate aims should be incorporated into the questions asked, should permeate the entire lesson in general. While no statistical data has been prepared on this point, a careful study of the material collected and careful observation revealed that in some cases a gap exists between aims and practices in the teaching of industrial and manual-arts subjects. The practice precedes the aim instead of the aim dominating the practice. Difficulty was experienced in detecting the ultimate objectives in some lessons.

While good questions require careful forethought and planning, the best questions are not always thought out in advance but are oftentimes brought out by the needs of the occasion. To answer genuine thought questions is not always easy and such questions cannot be numerous during a lesson period. The limited time at hand and the "double-time" pace of classwork do not afford an opportunity for much critical judgment, careful deliberation, or extended reflection. Furthermore, many students are not capable of making such judgments, or of giving intelligent responses to such questions. The aim, however, should be to ask an increasing number of thought questions as the lesson is developed with the class. Thought questions can be given to good advantage as a part of the assignment to be answered at the next day's discussion.

Table 4.

Suggested Use of the Question

Lesson
Teaching Method--Disciplinary Method of Recitation--Question and Answer--Line of Approach Development
1st Step
Locative, analytical and suggestive questions--To analyze the knowledge of related or unrelated facts possessed by the class so as to discover previous experience or training that suggests the "Starting point" "Jumping-off point", or "Point of contact."
2nd Step
Questions that take the student where he now is and lead him on through unfolding and developing the new material.
3rd Step
Questions that involve intelligent use or application of the acquired knowledge to the work in hand. Follow with unifying or recapitulatory questions that sum up the answers.
4th Step
Final Test or examination questions--Either oral or written.
Questioning Essentials
Address questions to the class as a whole.
Distribute questions over the entire class in no predictable order.
Do not repeat questions unnecessarily--ask once in the best possible form.
Ask the right question at the right time, that is, maintain continuity in the presentation.
Incorporate the aims of the lesson and the subject into the questions.
Keep memory questions at a minimum--aim to stimulate thought and action in the entire class by the use of questions so that students may arrive at few facts and principles through their own initiative.
Make the questions clear and brief--the fewer the words that call for what you want to know, the better.

The aim, however, should be to ask an increasing number of thought questions as the lesson is developed with the class. Thought questions can be given to good advantage as a part of the assignment to be answered at the next day's discussion. The various degrees of thought questions should be given due consideration while the employment of thought questions should lead to an intelligent discussion between instructor and class of the essential fundamentals of the topic.

INDUSTRIAL-ARTS MAGAZINE

EDITORS

E. J. Lake *S. J. Vaughn* *J. J. Metz*

GAINING INDEPENDENCE THROUGH LOYALTY

The lesson of loyalty to superiors in office is one of the greatest that a young teacher can learn. This fact needs to be repeated over and over again.

When a teacher enters an educational system, he surrenders, in part, his individual freedom and takes on the organized, or institutional, freedom and plans. This is made doubly difficult for the teachers of the industrial subjects, because of the varied systems of training given student teachers in the training schools. Frequently it happens that the new teacher comes into a field with training and opinions totally at variance with those of the supervisor and of the new system. The duty of such a teacher is clear. He must *become a part of the system* and set himself to the task of helping the supervisor to make the very best possible success of the *supervisor's* plans.

Having taken such an attitude of complete loyalty to the plans and ideals he finds in use in the system, and having given his best service in this spirit, the new teacher will soon have gained the confidence of his supervisor. Having obtained this, the newcomer will not be surprised to find himself being consulted about matters of courses, methods, equipments, etc. Then comes the ambitious young teacher's opportunity. His opinions will be listened to; his suggestions will bear weight; his advice will gradually come to be sought; and finally he will be given a free hand to work out his own ideas and methods. Such a thing can come about only through absolute and complete loyalty at the outset to the ideals, plans, purposes, and methods of the system and of the supervisor.

EXPLOITATION

The organization of industry in many places and the eternal grasping of many manufacturers to accumulate wealth, pay dividends, or meet competition has resulted all too often in having its effect upon apprentices. It is not unusual today to find an apprentice department running at a profit to the detriment of the best interests of the young learner.

We have no quarrel with industry here, but surely the instructor who has entered our school system direct from industry, biased by or strongly influenced by these conditions of industry, which are not conducive to the best training for our students, is not as yet a teacher in all that the term teaching implies.

There are those at present among our shop teachers who exploit the student to construct furniture or build machines for a school system under the cloak of economy or as an exhibit product to sell vocational education to school boards and citizens. The real product, the boy, was lost sight of in quest of a firmer stand-in for the instructor with those more in sympathy with the retrenchments of economy than efficiency in teaching methods.

It is an easy matter to turn out vast amounts of material products in our school shops, but it is a real teaching job to convert raw student material into constructive-thinking individuals in a shop activity.

A woodworking machine might be "set up" and for weeks stock run through this machine in quantity production, but if the example of a person learning to run an automobile was applied, the machine would be stopped, the setting changed from time to time, and the boy taught to learn, by mistakes if necessary. The output of material products would be lessened, but the student would profit.

A machine shop might turn out two or three machines of a different kind every semester, and result in a graduate student who has not had enough duplication of fundamental operations to take his place beside a student of a few months systematic training.

It is the old question again of the material product or the boy—production vs. instruction. It is not how many machines or articles of furniture turned out in a given time which determines the value of an instructor, but how much does industry think of the graduate student, and also what the student in years to come will think of his school shopwork.

ENGLISH

Quite a number of the really good industrial-arts and trade teachers in our schools have come from the ranks of those who at one time actually plied the trade which they are teaching today. These men know how hard they had to battle to acquire those subjects which the average mechanic looks upon as nonessentials. Almost invariably these shop teachers will admit that they are weak in English, although they have taken up the subject in summer schools and in evening classes. They know their weakness, and therein lies their strength. They are careful to have everything they write checked over by somebody who in their estimation knows something about English.

It is not necessary to limit these remarks to the teachers who come from industry, or to shop teachers at all. They are equally applicable to teachers of academic subjects. Most of us are not as well versed in the use of the written word as we should be, or would like to be, and therefore all of us can probably derive some benefit from these comments.

It is a trite saying that the letters which we send out into the world are our representatives. They disclose our character, and our shortcomings quite as much as anything we do.

Anyone who has had anything to do with letters of application written by prospective teachers, of shop as well as academic subjects, will readily agree that many were written by people who were either careless or very weak in their use of our language. Then, too, some of these letters make one wonder just how much the writer considered the effect his letter would have on the one to whom it was written.

The following example is an excerpt taken from a letter of application written by a man applying for a position as shop instructor:

"The applicant is a craftsman of 12 years practical experience. 2nd Year high school and associated with some of the foremost in their lines.

"Capable, using the simplest Forms in English, of Directing an individual or class.

"Instruction that will sink in the student's mind satisfy the most critical and cause your instruction Courses to be in real Demand.

"The services of the writer are obtainable at Five Hundred ($500.00) a month.—Results assured."

Probably no better example of how *not* to write a letter of application could be found. Judged by that letter, the applicant seems exceedingly egotistical and woefully ignorant, and yet that man may probably be a good teacher and exert a good influence on his surroundings. He expressed himself in the wrong way, however, and naturally was not given a chance.

A little care in the use of our English may help us avoid a similar embarrassment.

—✧—

WHEN WORK BECOMES PLAY

The industrial teacher who observes the interests of youth and uses the means by which those interests are controlled will at the beginning of the school year organize his pupils into some sort of self-governing but supervised school activities.

No time is quite so suitable for this as the time of approaching holidays.

The old-time debating clubs, spelling matches and literary societies supplied wholesome social and intellectual diversion and were a vital part of the school experience. Now young people are entertained in such a variety of ways and have so many social diversions of doubtful advantage that wholesome activities in which they may take active part are needed as an antidote.

Teachers of the right sort can promote the wholesome interests of young people through organization.

We have seen the example during the past year of a live young teacher of art who organized sketch clubs for evening work from volunteer models who posed in costume. The clubs were divided into competitive groups; exhibitions were held; honors were given for the best sketches and more and better work was done by the same pupils under this elective voluntary process than was done in the regular school classes. Work had become play under the direction of a clever inspiring teacher.

We believe the same thing could be done in other school subjects.

When young people are inspired by pride of accomplishment there is little need of discipline or arbitrary authority.

Young people, like old people, delight in self control and accomplishment. Of course a spirit of competition should be developed. The large group should be divided into teams which compete for honors; the work should have a practical interest and should not be identical with the school problem but should be elective in character and in process; it should be as elective and interesting and competitive as conditions will allow.

Work becomes play when it is voluntary; work is voluntary when it satisfies the ambition to accomplish and pride in accomplishment.

Youth is not lazy or indifferent by nature and requires only the clever influence of a wise leader to make play of the hardest kind of work.

—✧—

MIDDLE-AGE CONFESSIONS

Not being permitted to show tantrums and naturally cautious lest we lose our dignity, we teachers of middle age have a hard time keeping respectably young.

Yes! We are in the atmosphere of youthful optimism but that only serves to caution us against getting hilarious.

We hate that word professor.

It might make us proud if it sounded sincere but the patronizing way in which the baker, the barber, and the supply agent use it is irritating.

The necessary decorum of the schoolroom; the assumption on the part of everyone but ourselves that we are learned and scholarly; the solicitous address of fond pupils and parents and the rather pompous address of school and town officials make us assume dignity and on occasion appear more austere than we are by nature.

We direct the turbulent and disorderly traffic of youth without the policeman's badge or whistle or baton.

We sometimes sense a lack of authority in hand or back of us to administer justice where and when it seems most needed.

We almost wish we had taught school in the good old days when the school teacher was called the "schoolmaster," who had authority in proportion to his ability with a birch rod.

We could pick out several spoiled and tainted young bucks in our classes who might be benefited by an old-fashioned woodshed session.

When we see these precocious young gallants ogling the pretty girls of our school in the corridors we feel the need of a policeman's star. Then, too, those pretty girls seem to invite more familiarities than we recall being subjected to in our youth. We even wonder sometimes how the boys restrain themselves as well as they do and wonder if we would have done better than they under similar circumstances.

We are well past following the example of that gay young teacher of public speaking appointed last year and reappointed this year by suspicious influence of his social acquaintances. It is difficult to identify him as a teacher when he mixes up with the pupils in their social activities. For some reason they keep him busy as a chaperon under the necessity of having one around, but he never looks the part.

On the other hand we dislike the idea of going the road of our ossified old friend who has taught mathematics for 40 years and is now retired with a meager pension to spend his old age in obscurity and near poverty. It is said that he never knew one pupil from another and was so absorbed in his subject that he addressed the members of his own household by number.

The example held out by the superintendent of our schools to pupils and teachers at the first meeting of the year can be followed only by a genius for work. In private conversation the superintendent exposed the identity of his ideal to the older teachers. This ideal is now a great scientist who receives a salary almost equal to our football coach and works in the laboratory with special equipment of his own making.

That was rather a keen verse in the school paper with reference to the hard-working teacher or student:

"He can but work.
He lives apart from all around;
Self-centered; self-contained and proud
That joy in play he never finds."
"He can but work.
A relic of slave days long past;
He works from morn to morn and finds
No joy in life but work."

Well, we might as well confess, while confessions are in order, that there is no danger of working too hard in our case.

We have a lazy streak that will save us from disaster of that sort.

Our problem is the usual one of finding the happy medium.

Those bleacher and tea hounds are not impressive. We are too stiff in the joints and our arteries are hardening against ballroom and ball-field activities.

A parody on the above verse represents the other extreme.

"He can but play.
He lives a part of all around;
Elf centered; elf contained and vain
That joy in play he always finds."
"He can but play.
Example of the present day;
He plays from noon to dawn and sleeps
The other hours away."

Yes! Our problem is to find the happy medium.

ARCHITECTURE FOR HIGH-SCHOOL STUDENTS

Robert F. Smith, Instructor in Architecture, Miami Senior High School

ARCHITECTURE is a subject too often neglected in our high schools. In the past we have been satisfied to include architectural drawing with our mechanical-drawing courses which wrongfully classifies it as a mechanic art rather than a fine art. Instead of having taught the cultural side, the historical and artistic, we have been dealing with it in the light of structure and materials only. The ideal course is a combination of these, a course to include house-planning, a knowledge of the five orders, history of architecture, an ability to know architecture and a technic of drawing. This course may be vocational or not. It is of value to all, but it has proved its value vocationally since many of our students have become successful draftsmen and others have received advanced credit on their work in several leading colleges of architecture.

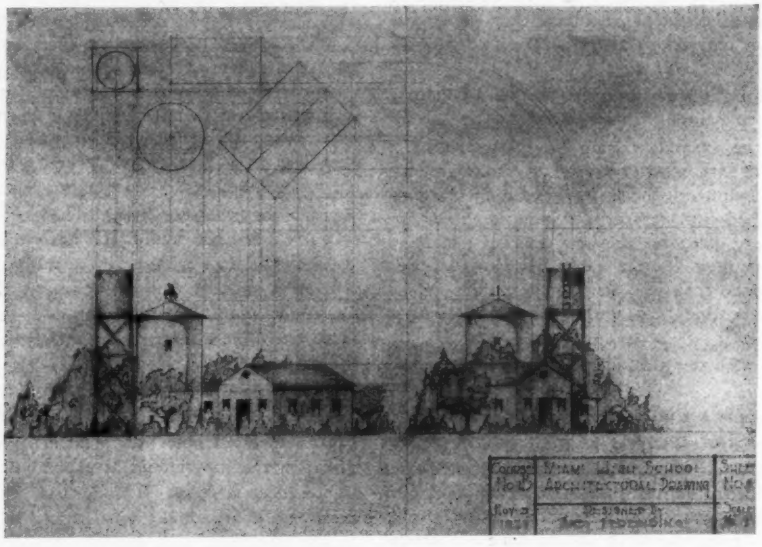


FIG. 1. PROJECTION METHODS COMBINED WITH SKETCHING. ARCHITECTURAL-DRAWING COURSE, MIAMI HIGH SCHOOL. ROBERT F. SMITH, INSTRUCTOR.

The three-year course at Miami Senior High School is planned as suggested in the foregoing. Students are required to have one year of mechanical drawing either in junior-high or our own school where we stress shape, description, projection and perspective. Our first year in architecture includes a transition period during which we gradually diminish mechanical detail, and work toward a freer or more sketchy type of technic. Thus the projection of the group of farm buildings shown in Figure 1, are made to "live" by means of sketching. Figures 2 and 3 deal with light and shadow on architectural members, and it is in the study of shade projection that the actual knowledge of architecture begins.

These two figures illustrate the method of conventionally showing shadows. A study of the two illustrations shows how the shadow is projected from side or top view on the façade. The problems selected for this work are of real architectural value, as, for instance, the doorway with its pilasters, transom and entablature. They are used to illustrate the elements which the student needs to progress. The second semester is given over to the study of a set of working drawings for a small house, and students are given a set of plans of a house of proved design. These plans are incomplete, and the study of the set is taken up by the entire class. These discussions are accompanied by blackboard talks on construction, proportion of openings, fireplace design, cabinets, and other similar topics. Free-hand sketching also forms a part of this semester's work and the sketch of the English house illustrated in Figure 4 is an example. Many students find it impossible to elect more than one year of architecture but during this year they can, by following a course such as is described in

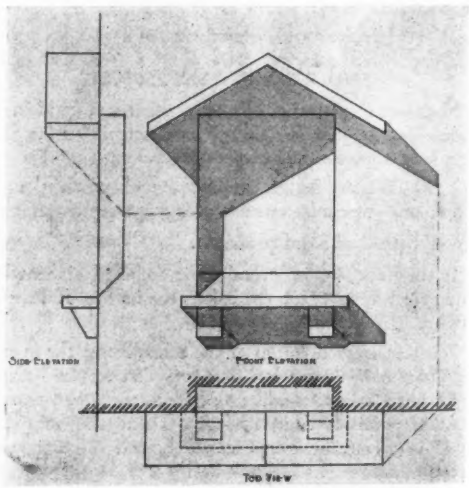


FIG. 3. LIGHT AND SHADOW. ARCHITECTURAL-DRAWING CLASS, MIAMI SENIOR HIGH SCHOOL, MIAMI, FLA.

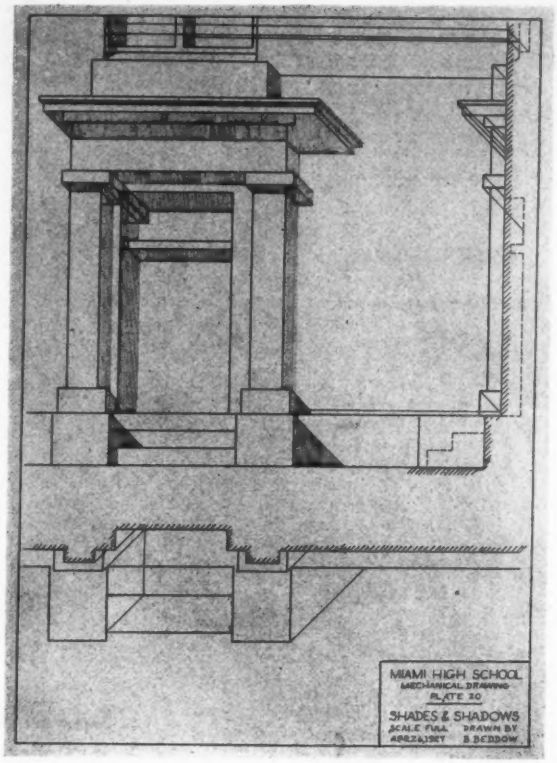


FIG. 2. A STUDY OF LIGHT AND SHADOW MADE BY STUDENTS IN THE ARCHITECTURAL CLASS OF MIAMI SENIOR HIGH SCHOOL, ROBERT F. SMITH, INSTRUCTOR.

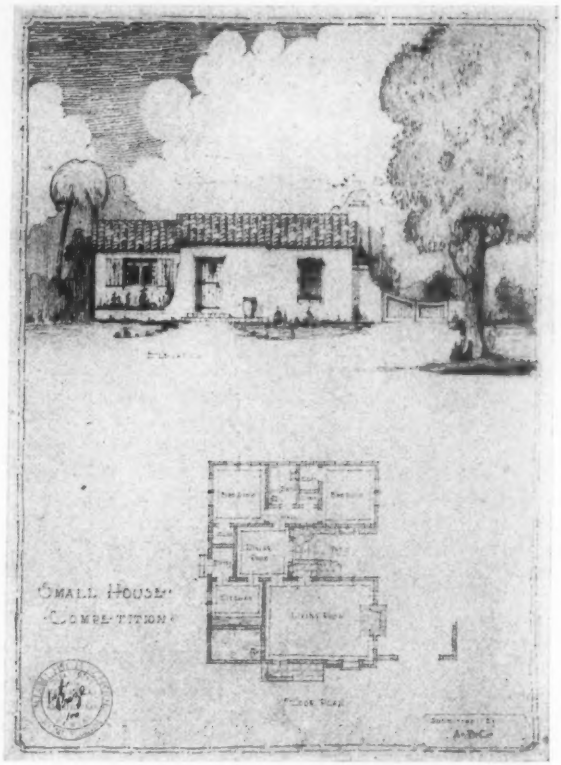


FIG. 5. DRAWING WHICH WON THE FIRST PRIZE IN THE "SMALL HOUSE COMPETITION," MIAMI HIGH SCHOOL.

the foregoing, obtain elementary architectural training which will be of real value.

During the second year the "free style" is continued in the form of sketching classes once a week. These are held out of doors when weather permits. This gives them an opportunity to study local buildings. The backbone of this third semester's work, however, is the series of talks given by the instructor on the history of architecture. This is the foundation for a set of plates on the five orders with notes and drawings on the elements taken from the blackboard sketches.

Our first competition in house design is held during the fourth semester and the final drawings are due during "Better-Homes Week." This competition is sponsored by the Miami *Daily News*, prizes are awarded and the judges are selected from the practicing architects of Miami. The two houses illustrated by Figures 5 and 6 won first and third places in the 1927 class. In planning competitions or any design problems, students should be given ample time to make a thorough study of the problems assigned, and all the rough sketches and detail sketches which they may require. It is

FIG. 4. SKETCH OF AN ENGLISH HOUSE. MIAMI HIGH SCHOOL.

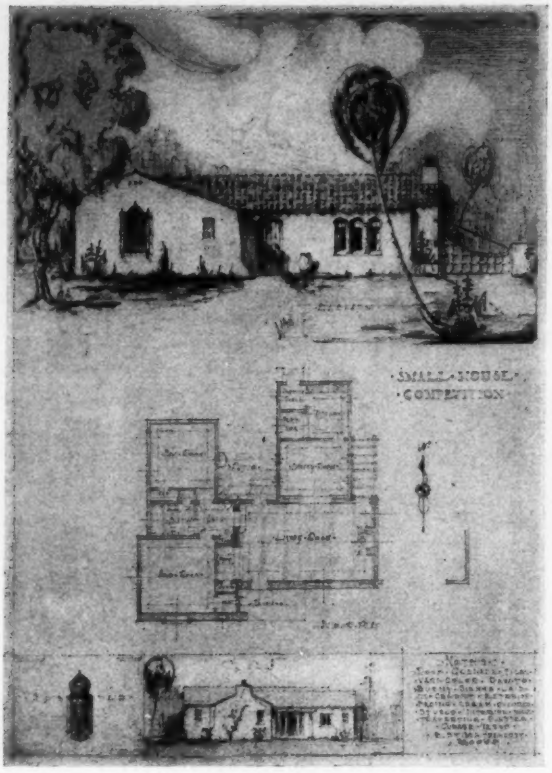


FIG. 6. DRAWING WHICH WON THE THIRD PRIZE IN THE "SMALL HOUSE COMPETITION," MIAMI HIGH SCHOOL.

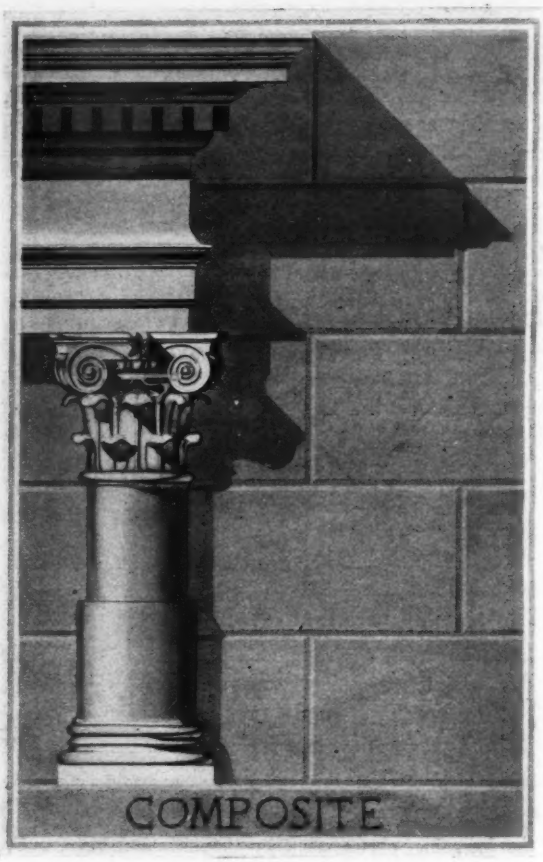


FIG. 7. WASH DRAWING MADE BY A STUDENT OF MIAMI HIGH SCHOOL.

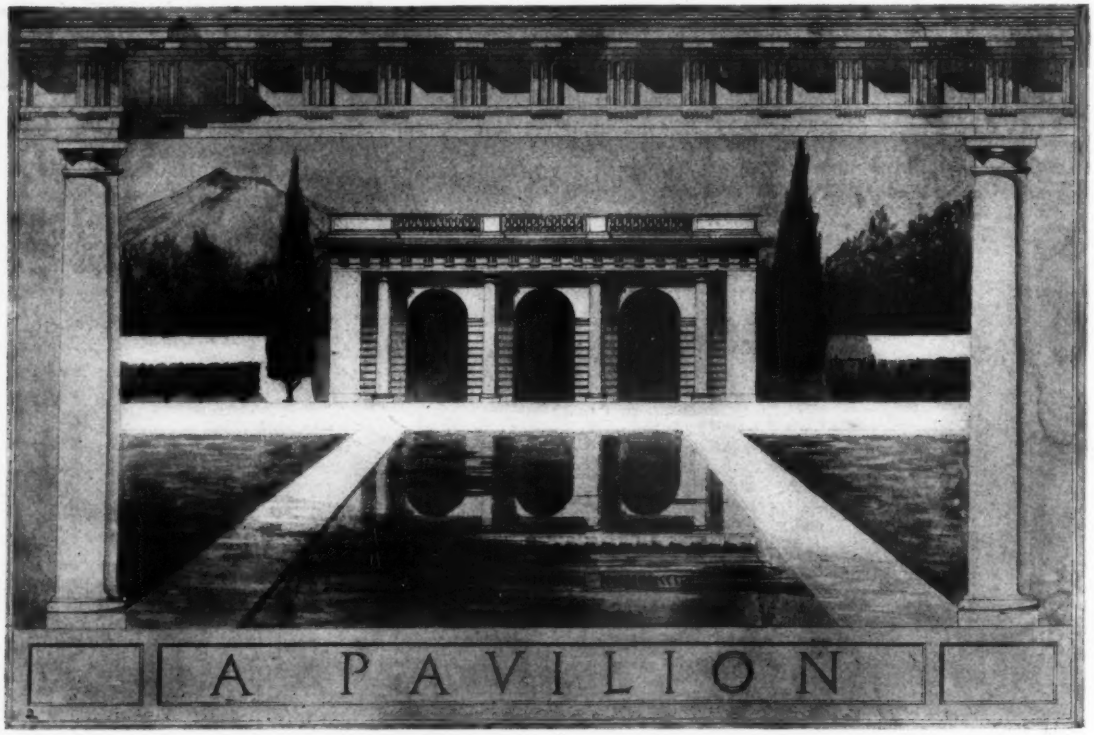


FIG. 8. A DESIGN SUBMITTED IN A COMPETITION FOR A "PAVILION IN A GARDEN." MIAMI HIGH SCHOOL.

well for them to organize sketchbooks of all usable material for the problem involved, and for some time preceding the final date, class discussions should be held on different questions which arise with individual students.

Our third-year course is based on the elements, because most of the students in this class are preparing for university courses in architecture. Students are assigned problems with these elements in combination, as simple doorway or window designs, followed by the use of the orders in small buildings. These problems are usually assigned in the form of competitions to be rendered in monotone wash.

The effects of light and shadow are studied and rendered in their relationship to the building, but above all, a sense of proportion in design and a knowledge of fundamentals are the basis of the third-year work. Sketch problems are assigned at times and measured drawings of the feature of existing buildings are of value. A medal is awarded annually at commencement for proficiency in architecture during the senior year.

Figure 7 shows a composite column rendered in Van Dyke water color. The American Vignola is used for reference in proportioning the orders and laying out their shadows. Figure 8 is a drawing which was entered in a competition for a "Pavilion In A Garden." In all of these problems the orders and elements are given first consideration. The spirit of competition is of great value in high-school work and results are most pleasing.

This part of our work is based on the system of competitions used in the architectural colleges sponsored by the Society of Beaux Arts Architects of New York, and we hope that at an early date this organization will recognize the value of early training, and arrange junior competitions for high-school students.

WHAT THE OTHER FELLOW IS DOING

The response in the way of letters offering frank constructive criticisms to "A Question of Method" has been very satisfactory. Each letter showed that the writer took an interest in the other fellow's problem, and that he was willing to assist in solving it.

The problem as stated in the October issue of the I. A. M. is as follows:

A QUESTION OF METHOD

Mr. Machine-Shop Teacher—What Do You Think?

A machine-shop instructor submits the following suggestion:

"The first two jobs which a boy does in my shop is to turn a ¾-in. piece of cold-rolled steel down to ½ in. in diameter, and a 1 1/16-in. piece down to 1⅛ in.

"This seems to be very elementary and simple, and yet when we take into consideration the various tools, and the operation of the lathe with its multiplicity of handles and knobs, we need not feel surprised that the boy is sorely troubled.

"In order to give the boy an understanding of the lathe, and a knowledge of the tools in a minimum period of time, the following method is used: The turning tool is marked with red paint, the cut-off tool with black, and the side tool with green. The feed knob of the lathe also is painted red.

"In this way there is very little trouble in getting the boy to understand that he is to use the red feed knob only when he is using the red turning tool. At the beginning, the boy learns to call the tool by both its name and its color. Thus: red, turning tool; black, cut-off tool; green, side tool. Later on in the term, the paint wears off, and the students are then expected to call the tools only by the correct names, although some continue to add the color to the name throughout the entire term."

DO YOU THINK THIS IS A GOOD METHOD FOR TEACHING ELEMENTARY LATHE WORK?

WHAT, IF ANYTHING, IS THE MATTER WITH THIS METHOD?

HOW DO YOU HANDLE THIS PROBLEM?

The answers were uniformly good, and it was difficult to decide which one was the best. After much debate the prize was awarded to H. E. Miller, instructor of machine-shop practice, Central High School, Tulsa, Okla. His answer is reproduced herewith.

Papers which deserve honorable mention were received from the following:

E. C. Carter, Schenley High School, Pittsburgh, Pa.

George C. Donson, Washington, Pa.

T. P. Fiske, Daniel C. O'Keefe Junior High School, Atlanta, Ga.

J. T. Hays, Bucyrus, Ohio.

Orin A. Ringwalt, North High School, Minneapolis, Minn.

James Sidlow, Milwaukee Vocational School, Milwaukee, Wis.

C. A. Strom, Manitowoc, Vocational School, Manitowoc, Wis.

Teachers from the following states were represented in the contest:

Connecticut, Georgia, Illinois, Indiana, Kansas, Massachusetts, Michigan, Minnesota, Ohio, Oklahoma, Pennsylvania, Washington, and Wisconsin.

A QUESTION OF METHOD

H. E. Miller, Central High School, Tulsa, Oklahoma

In discussing the article, "A Question of Method," as it appeared in the October edition of the INDUSTRIAL-ARTS MAGAZINE, it is necessary that I do so by making a comparison with the method which I use in my beginning lathe work. I realize that one instructor might be successful in using one method, while another instructor might be more successful with another method. I am not attempting to turn out first-class machinists in my high-school classes, nor in my night-school classes. However, I do expect that the training which they receive under my supervision shall give them advanced standing when they go out into the shops of our city. In order to give them a practical foundation it is my aid to teach them to perform operations on the machines exactly as they will find them being done in the commercial shops.

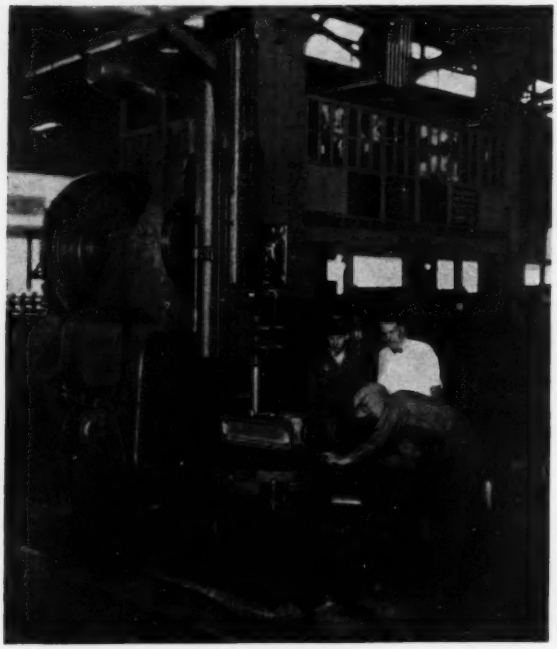
I have never found it advisable to give a student an exercise involving certain desired operations when these operations can be incorporated in some good, practical project. To hand a student a piece of stock and instruct him to turn it to a certain dimension arouses neither interest nor competition in the class. It is true that a student is apt to turn his first piece smaller than the given dimension. He is given a piece of stock of sufficient diameter to allow him two trial diameters. By the time he is ready for the third diameter, which is the finished size, he should have no difficulty in getting it turned to the correct size.

Most of the students who come to me have no machine-shop background. The greater part of their shop experience has been in woodwork. Everything in the shop is new to them. Laying a foundation and building upon it affords an opportunity for some real teaching on the part of the machine-shop instructor. Many of the mistakes made by beginning students are the result of the instructor's attempt to crowd too many new things into the student's mind in a single demonstration. For instance, I can see no good reason for using a color scheme for painting tools and parts of machines in beginning lathe work. The addition of a color scheme merely complicates the student's problem. A teacher of typewriting would not paint the letters on the keys with the expectation that the students would have mastered the keyboard by the time the paint had worn off. The operation of a lathe and of a typewriter are alike in that the student must learn the position of the controls, and must perform the operations more or less automatically. The difficulties which a beginner encounters in his first attempt at the lathe are not due to his failure to learn controls and their relation to certain tools, but rather, to a lack of mental and muscular coordination. The development of this coordination is acquired by constant practice. A very common complication which the student encounters is in not knowing which way to turn the knob to stop the feed. Any number of shop kinks may be tried to help him remember

how it is done, but only experience in doing it will cause him to automatically perform the operation. A machinist does not stop to figure which way to turn a nut to loosen it. He merely applies his wrench and automatically turns the nut correctly.

The method which I use in starting beginners seems to bring satisfactory results. After all, it is results we want, regardless of the method used to obtain them. The first-semester lathe jobs in my shop consist of work between centers, some facing in the universal chuck, and one project, given near the end of the semester, in the independent chuck.

The toolroom checking service is used in issuing all tools. The lathe sets contain: 1 pair each of 6-inch, inside and outside calipers, 6-in. scale, wrenches, side tool, $\frac{5}{16}$-in. Armstrong



APPRENTICE TRAINING AT THE UNION PACIFIC R. R. SHOP. MR. ALFRED VESTEY, INSTRUCTOR, LOS ANGELES, CALIF.

tool holder, ¼-in. Armstrong tool holder, and an Armstrong cutting-off tool holder with bit. Since most of the beginning work is done between centers the cutting-off tool is not used. The successful use of this tool requires considerable skill in operation. The turning tool bits are ground by the instructor and placed in the toolroom for the use of the beginning student. I keep these tools in good condition so that by using a correctly ground tool the student gets good results, and he learns to recognize a well-shaped tool. About the middle of the semester the student is given a piece of soft steel, ¼-in. square, and is instructed how to grind a turning tool. When he grinds this tool so that it passes inspection, he is given a bit of high-speed steel to grind. This tool becomes the property of the student and he is required to keep it in good condition.

The first instruction to the class is given by means of a demonstration at the lathe. The points emphasized are: principal parts of the lathe, (chiefly those which the student uses in his first work), centering a piece of stock, setting it up between centers, starting and stopping the motor, use of the clutch in starting and stopping the lathe, calling attention to the fact that the lathe may be adjusted to different speeds and feeds, use of the side tool, setting the turning tool, making first cut, how to set and to use outside calipers, and how to gauge depth of cut when nearing a specified dimension. Feeds and speeds are not taught at this time. In order that the student may experience the operation of the lathe at the correct speed and feed, the instructor should set the machine. No experimenting is permitted at this time. The student is given a piece of stock and instructed to make his set-up. He is not permitted to start until his set-up has been inspected. His start is supervised by questioning him on various points of the operations. He responds to the questions by showing how he intends to do the job. If he demonstrates that he thoroughly understands his task he is allowed to proceed. It takes time to make the rounds of the class in this manner, but I feel that it pays. The kind of start often means the difference between a good and a poor workman. Job sheets are not introduced at the beginning because the student does not have sufficient background to interpret them intelligently. Later on they are used to good advantage. Above all things, necessary precautions should be taken to prevent undesirable situations which might destroy the student's confidence in his ability to operate the lathe.

"CALIFORNIA, HERE WE COME"

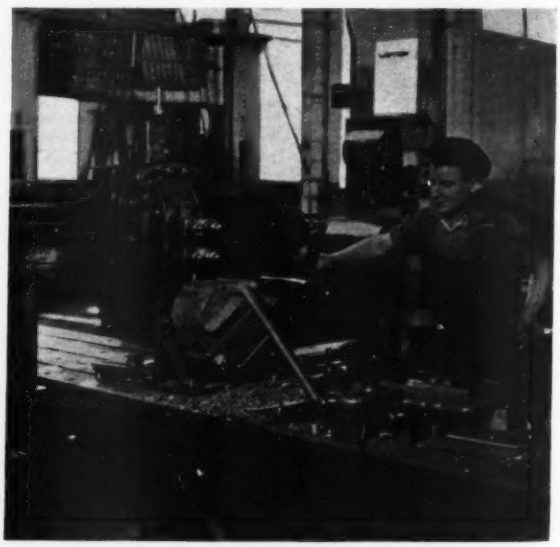
W. S. Kienholz, Director Department Vocational Education, Los Angeles, Calif.

All California, and particularly Los Angeles, is awaiting, and will be host to, the men and women of this country who will attend the American Vocational Association Convention to be held in Los Angeles December 17, 19 and 20.

California will also have something of interest for those who may come for pleasure and recreation; especially will there be something for the good wives of the attending serious-minded "vocationalists."

Although I could speak well for all California and perhaps the whole Pacific Coast, I want to confine myself to the convention city—Los Angeles.

Visitors will find their way here on one of the three great near-transcontinental lines, Santa Fe, Union Pacific and Southern Pacific. Some may come by way of the Panama Canal or even travel by air. Our friends from the Islands, bedecked with the Hawaiian Lea, will come by water as the air service to Honolulu evidently is still too risky. After crossing snow-covered plains, mountains, deep canyons, sage-brush-covered deserts, etc., our eastern friends will enter a land of flowers, orange groves, green lawns and beautiful homes, and finally arrive at the great metropolis of the west



AN APPRENTICE PLANING JOURNAL BOXES AT THE LOS ANGELES RAILWAY MACHINE SHOP. MR. ALFRED VESTEY, INSTRUCTOR.

coast, Los Angeles, with its 400,000 inhabitants. Yes, Hollywood is here too; it is a part of Los Angeles.

Some of you may be suffering from "train legs" on your arrival and will want to try your hand at golf on some of the numerous all-green golf courses in and about our great city. Well, the local committees are getting ready to be at your service.

Aside from Southern California being the land of sunshine and flowers, you will find many things of interest educationally. Los Angeles boasts one of the finest educational systems in America. No city has better school buildings. Her 51 (yes we now have 51) high schools are without exception real monuments to education. The 298 elementary schools are housed in buildings of the most modern types. Los Angeles has been most liberal in furnishing her school children with everything a modern school system might wish; splendid buildings, ample and up-to-date equipment, courses of study rich in content and diversity, and above all a splendid teaching body.

UPHOLSTERY CLASS, LINCOLN HIGH SCHOOL, LOS ANGELES, CALIF.

In vocational education, I feel we have been particularly fortunate. Phases of vocational or prevocational training may be found in all of our 51 high schools. Our 20 junior high schools all have separate shop buildings where from four to seven shop activities for boys are provided. Most of the shops are specialized, there being very few general shops. In the senior high schools all shops are special. In many of them the work is organized under the federal vocational act.

Shop heads, with us, are supervisory heads. Departmental supervision occupies all or the greater part of the time of the shop head. Vocational instructors are drawn from industry; seven years in the trade is the minimum trade requirement. All such candidates must pass a state technical examination and are then subjected to two years of teacher-training conducted by the state university. Before being accepted by the Los Angeles board of education the candidate must also take the city-school examination.

Besides the usual shop courses such as woodshop, auto mechanics, electricity, printing, etc., of which we have many classes, a few activities that might be considered "unusual" may be of interest. Lincoln High School, a cosmopolitan high school with many vocational activities, has a building devoted to ceramics. Here you will find a modern laboratory for testing clays, pug mills and other machines used in ceramic work. Firing is done in a large outdoor kiln.

At the Lafayette Junior High School, chefs are being trained for dining cars and hotel kitchens. These classes have operated successfully for the past seven years. A practical chef is instructor.

At the Frank Wiggins Trade School, where some 40 different trades are being taught, there will be many things of special interest to the visitors. First, I would call attention to the power-sewing school which occupies the whole eighth floor of the building. This department pioneered trade training in Los Angeles more than eight years ago and has been in operation ever since. Today the garment industry of Los Angeles looks to this school for many of its workers, particularly those trained on the more complicated special machines. Another special feature of the trade school is the department of beauty culture. This department occupies the whole ninth floor of the trade school. It is one of the largest and best-equipped beauty schools in the country. Three instructors are in charge with several assistants. Classes are held both day and evening. Another trade taught at the trade school, not usually found, is pressing, spotting and dyeing. Here may be found steam pressers of modern types and a well-equipped chemical laboratory for the work in spotting. The sign-painting school and the school of telegraphy have features not usually found in trade training and should be of interest to the visitors. These classes have been among our most successful and are largely attended.

Without doubt the Frank Wiggins Trade School will have many things of interest for the friends of vocational training and with "open house" each day of the convention visitors will have a splendid opportunity to visit this modern eleven-story building located but a few blocks from the convention headquarters.

Los Angeles is getting ready for the largest and best vocational convention yet held. According to reports received from different parts of the country the 1927 convention will be just that. Something seems to tell me that I hear, "California, Here We Come."

What Evening Schools Aim to Do

We should not lose sight of our aims in vocational education. Evening schools are not helpers in settling labor disputes, for the purpose of gossip or the discussion of theory, but for the education of those who try to help themselves. —*C. A. Prosser.*

This illustration shows the effect of the weather on unpainted surfaces. The warping of the board due to this exposure was sufficient to pull a nail. Paint would have prevented this occurrence.

Photograph by Forest Products Laboratory, U. S. Forest Service.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

MAGAZINE BASKET

C. Anthony Van Kammen, Grand Rapids, Michigan

On page 382 of the October issue of the INDUSTRIAL-ARTS MAGAZINE was published an article on wastebasket construction using the "Rawide" cardboard cartons, in which paper toweling was shipped, for the side walls. The material proved very satisfactory and a second problem was decided upon. The author had a magazine-basket design that had, from its first introduction, become quite a favorite among the boys, some boys making more than one to give to friends. There was only one trouble. The problem required too much lumber in its construction. It was decided, therefore, to use cardboard panels for the center partition and for the sides. The result was the method of construction shown in the working drawing Figure 1.

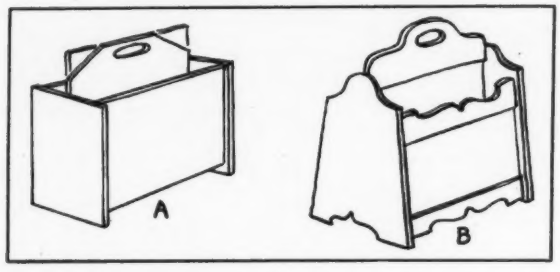


FIG. 2. MAGAZINE BASKET, DESIGNED BY C. ANTHONY VAN KAMMEN.

The problem was given to an entire seventh-grade class, using woodworking machinery. Each boy was required to use the same general dimensions, for length, width, and height. These were evolved in class at blackboard from the sizes of magazines and folded papers, borrowed from the library. In its simplest form, considering only the standpoint of utility, the magazine basket might appear as in Figure 2A. But an object should be beautiful as well as useful, hence each boy was required to create a contour enrichment of his own design. Figure 2B suggests how the contour enrichment may be developed. The upper part of the central panel, where strength is needed to carry the basket, is made of wood. For each side two stretchers are used with cardboard panels. The base and ends are made of wood. It is suggested that the base and ends be glued up from narrow stock to prevent warping.

The stock bill, finished sizes only, follows:

2 pc.	14 x 10 x ⅜	Ends, basswood
1 pc.	13½ x 8½ x ⅜	Base, basswood
1 pc.	13½ x 6 x $\frac{7}{16}$	Center top, basswood
2 pc.	13½ x 2¼ x $\frac{7}{16}$	Upper stretcher, basswood
2 pc.	13½ x 2¾ x $\frac{7}{16}$	Lower stretcher, basswood
2 pc.	5 x 2½ x ⅛	Handle veneer, basswood
1 pc.	13½ x 11¼ x ⅛	Center panel, cardboard
2 pc.	13½ x 8½ x ⅛	Outer panels, cardboard

All contours are drawn free-hand and full-size on the working drawing. Notice that in the little sketch, Figure 2B, the stretchers are straight on the panel side. This makes it easy to cut the grooves for the panels. The inner edges may be contoured slightly but not with too great a curve as it makes the cutting of the grooves too dangerous for the boy. Another disadvantage is that the sides of the grooves split off or become cracked because some parts of the groove are cut too deep. With a sharp slitting gauge and the use of a ⅛-in. chisel the groove may be worked out by hand when the contours are too elaborate for the circular saw. Keep the wood well down in the vise when working with a chisel. Use simple curves and keep in mind the method of construction. The contour design offered is only a suggestion and should not be copied.

Band-saw, file, and sand the stretchers before the grooves are cut. As the handle veneer may be in the way of the circular-saw

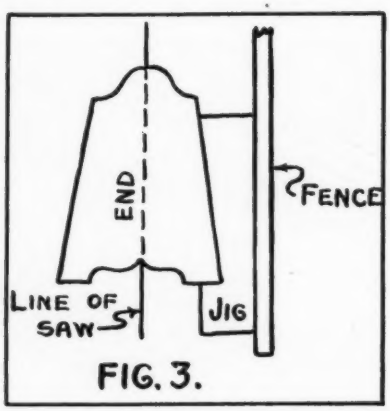


FIG. 3.

JIG TO BE USED FOR CUTTING CENTER GROOVE IN MAGAZINE BASKET ENDS. C. ANTHONY VAN KAMMEN.

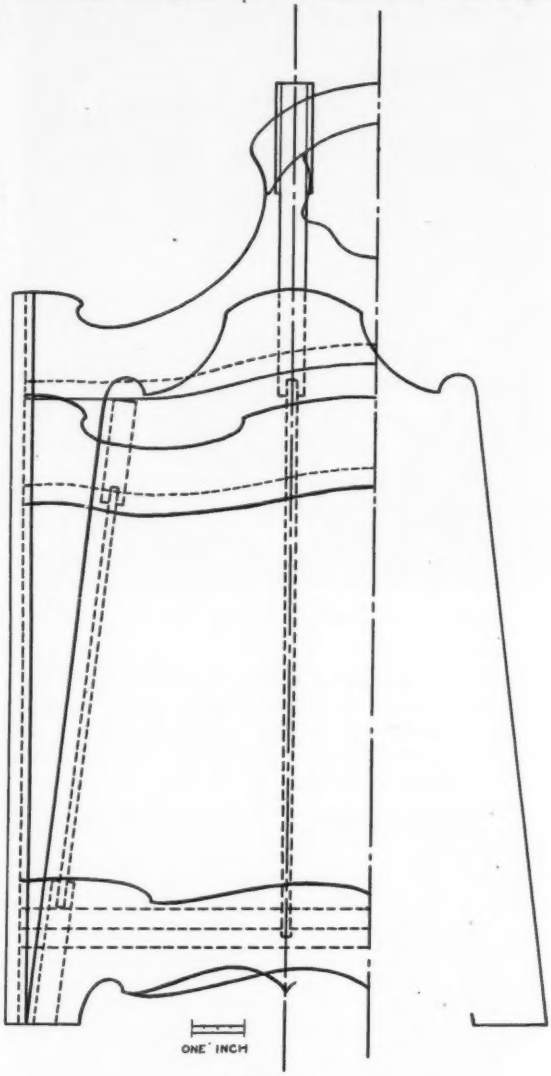


FIG. 1

CONTOUR DESIGN FOR THE MAGAZINE BASKET. C. ANTHONY VAN KAMMEN.

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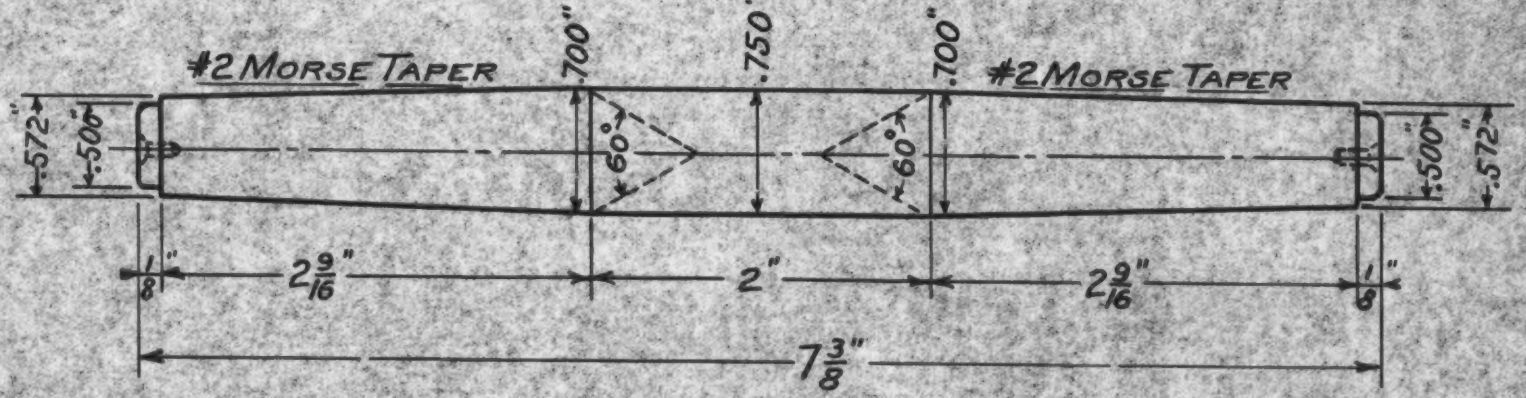

LATHE CENTERS

GE

Designed by Geo. F. Johnson, Grand Rapids, Mich.

For Description See Page 464, Industrial-Arts Magazine, December, 1927.

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THE INDUSTRIAL-ARTS MAGAZINE,
DECEMBER, 1927

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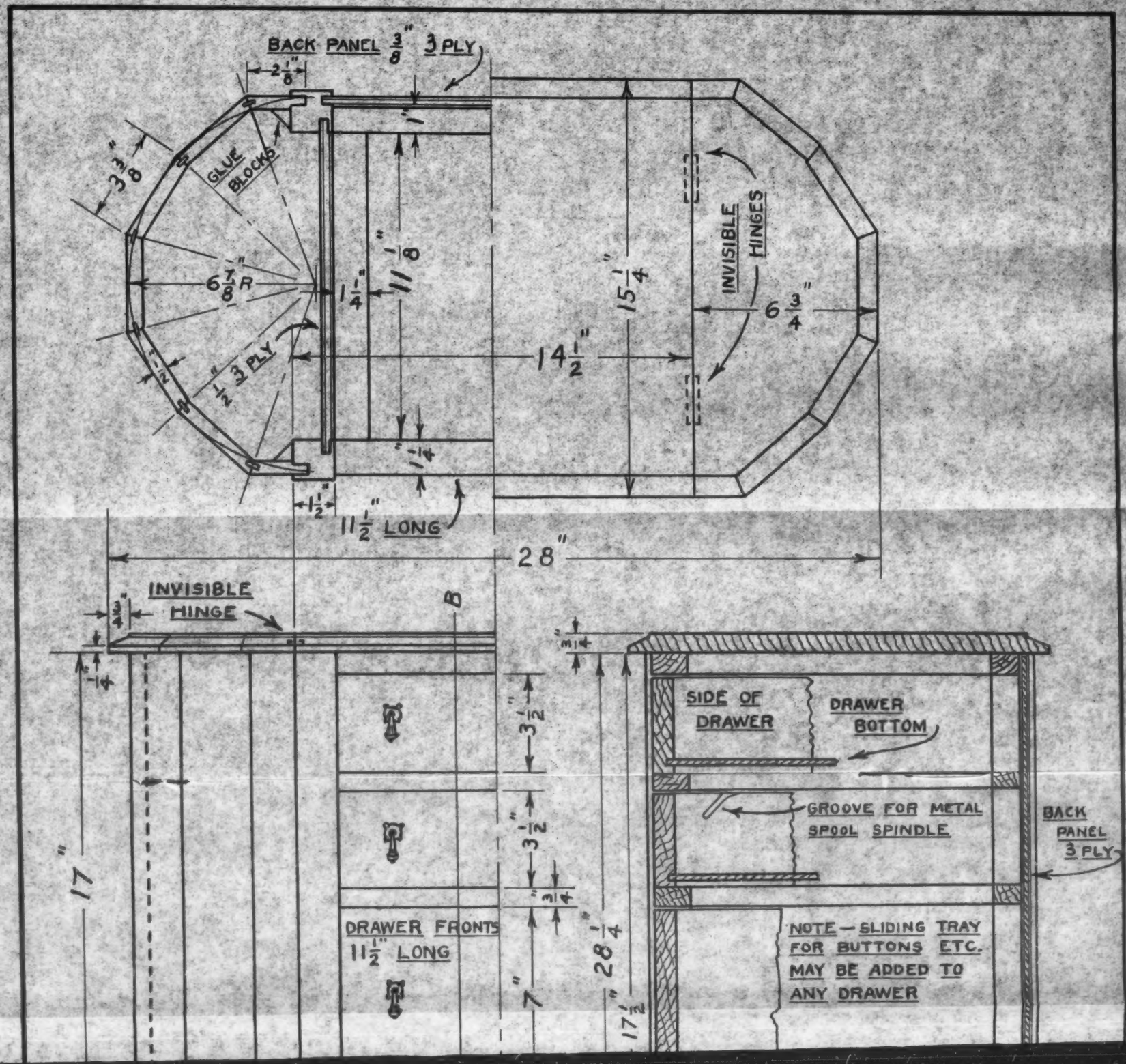
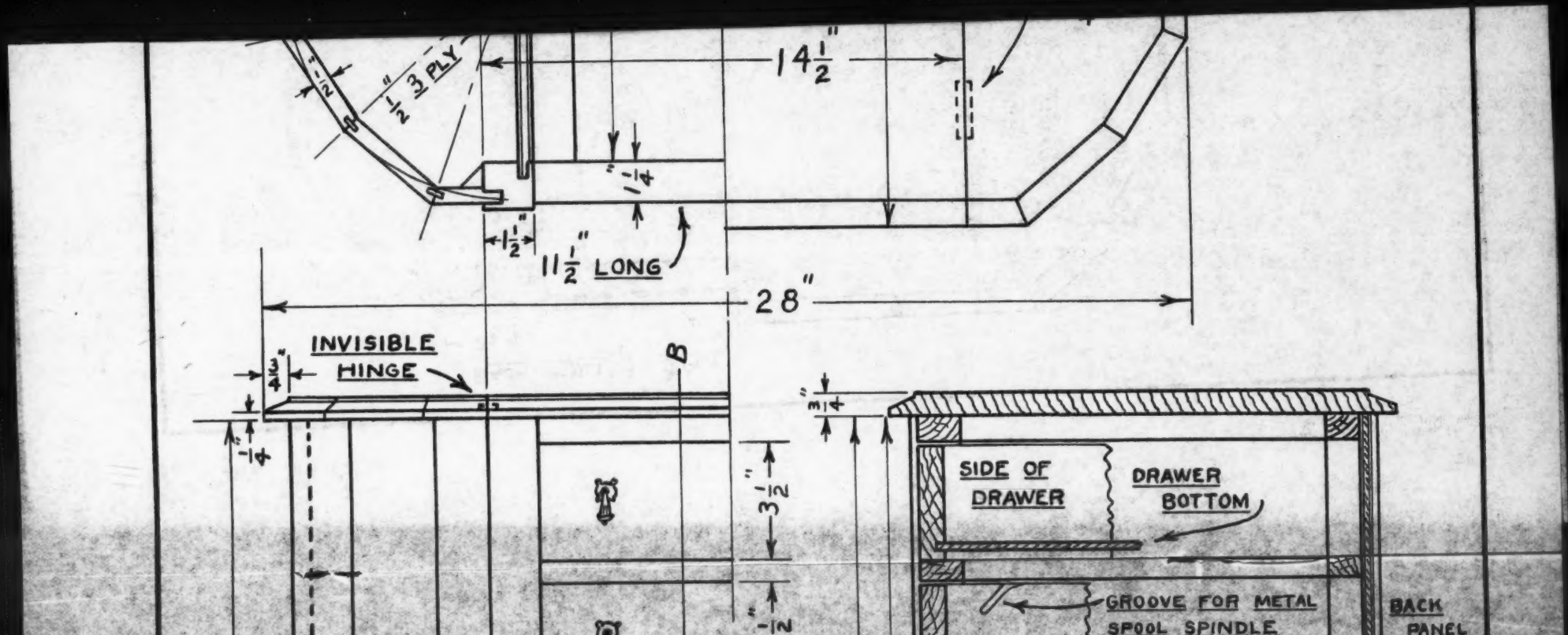
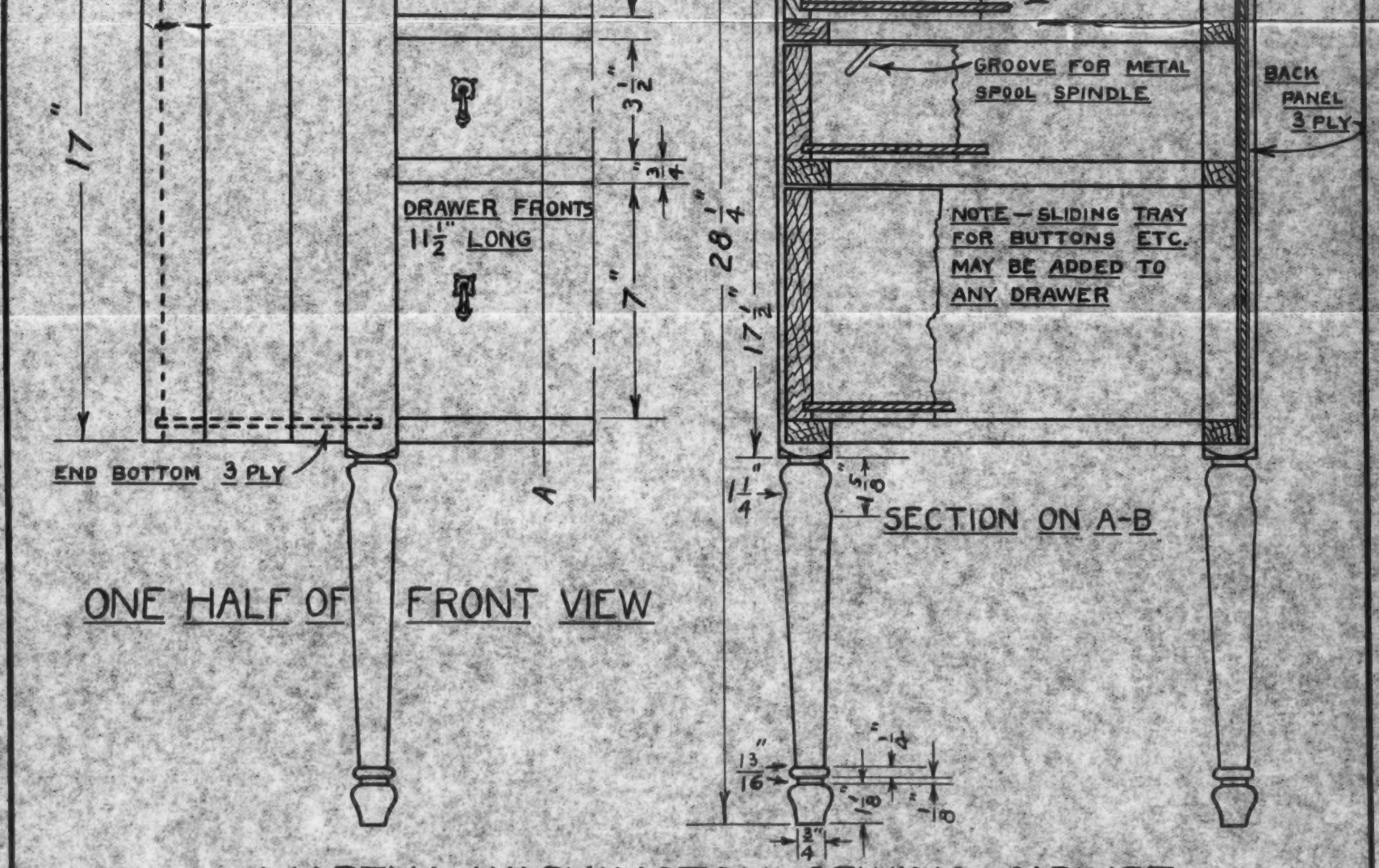



14 1/2"
1/2" 3 PLY
1/4"
1 1/2"
11 1/2" LONG
28"
INVISIBLE HINGE
3/4"
B
1/4"
3 1/2"
1/4"
SIDE OF DRAWER
DRAWER BOTTOM
GROOVE FOR METAL SPOOL SPINDLE
BACK PANEL



MARTHA WASHINGTON SEWING CABINET

J. J. LUKOWITZ
MILWAUKEE WIS.

Designed by J. J. Lukowitz, Milwaukee, Wis.

For Details See Page 469, Industrial-Arts Magazine, December, 1927.

TRACING SUPPLEMENT No. 80,
THE INDUSTRIAL-ARTS MAGAZINE,
DECEMBER, 1927

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"MECHANICAL DRAFTING IS THE UNIVERSAL LANGUAGE OF THE INDUSTRIAL WORLD"

DESK CHART FOR DRAFTING STUDENTS by John F. Faber

INCLINED GOTHIC LETTERING

ABCDEFGHIJKLMNOPQRSTUVWXYZ&
1234567890 abcdefghijklmnopqrstuvwxyz

STRIP TITLE

NAME OF SCHOOL CITY, STATE	NAME OF OBJECT SCALE	DWN - STUDENT TR - CKD - DATE -	CLASS DWG. NO.

BALANCED TITLE

2" GLOBE VALVE
ACADEMY HIGH SCHOOL
ERIE, PENNA.
DWN - W. NAVAUGH TR - T. DAILEY CKD - [illegible]
NOV. 1, 1923

POOR LETTERING SPOILS THE APPEARANCE OF ANY DRAWING.

BLOCK TITLE

	CAP	4	C.I.	
	ECCENTRIC	1	C.I.	
2	SUB-BASE	1	C.I.	
1	FRAME	1	C.I.	
PART NO.	NAME OF PART	NO. REQ.	MAT.	REMARKS

STEAM ENGINE DETAILS

NAME OF SCHOOL CITY, STATE	DWN - NAME OF STUDENT TR - APP - CKD - DATE -	MACH. NO. 147

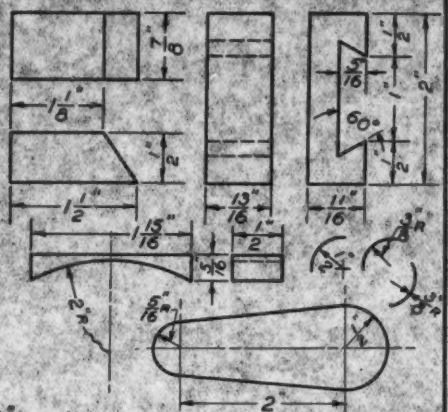
COMPARISON OF LINE CONVENTIONS

- BORDER LINE
- OBJECT LINE
- INVISIBLE OR DOTTED LINE
- CENTER LINE
- EXTENSION LINE
- $2\frac{1}{2}$" DIMENSION LINE
- CROSSHATCH OR SECTION LINE

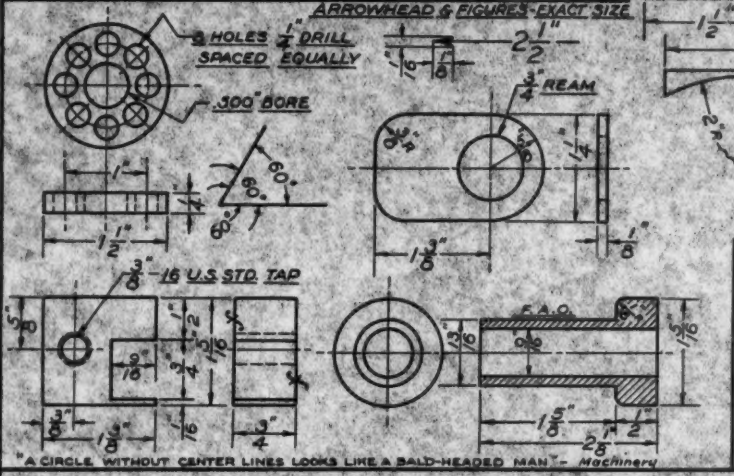
NOTE - WEIGHT OF ALL LINES DEPENDS UPON OBJECT & SCALE USED

"AN ARROWHEAD HAS A NARROW HEAD" "PRACTICE MAKES PERFECT"

SAMPLES OF DIMENSIONING

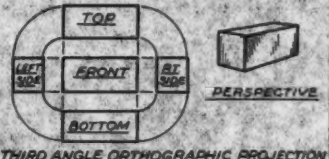


ARROWHEAD & FIGURES - EXACT SIZE



"A CIRCLE WITHOUT CENTER LINES LOOKS LIKE A BALD-HEADED MAN" - Machinery

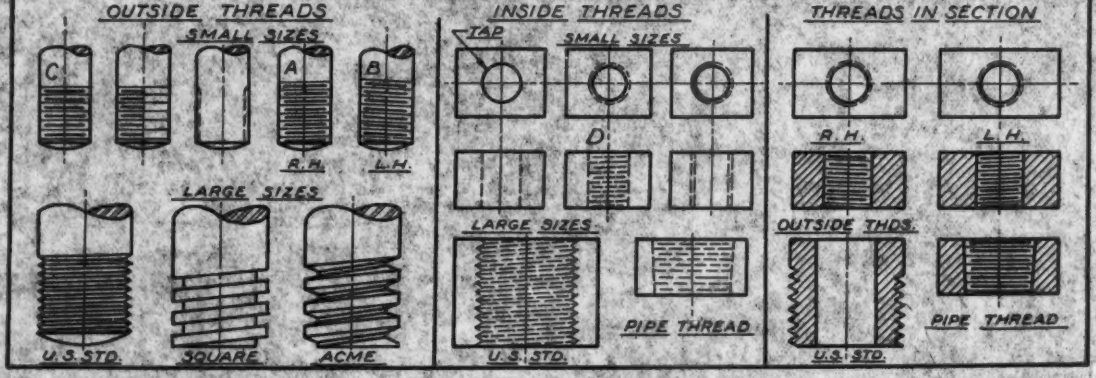
PLACEMENT OF VIEWS



THIRD ANGLE ORTHOGRAPHIC PROJECTION

STANDARD SECTIONS & BREAKS

SCREW THREAD CONVENTIONS



Designed by John F. Faber, Erie, Pa.

For Details See Page 469, Industrial-Arts Magazine, December, 1927

fence when the groove is cut, the pieces should not be glued in place until after grooving. Cut the base to the proper size with the sides cut at the correct slant. Do not cut the groove in the base until the grooves in the ends are cut, so that it will be properly located. When cutting the center groove in the ends, use the wedge-shaped piece cut from an end or make a jig such as is used for cutting wedges. (See Fig. 3.) The center groove may be cut through from end to end. The side grooves are stopped at the top. This necessi-

FIG. 4. ASSEMBLING THE PARTS OF THE MAGAZINE BASKET.

tates placing marks on the saw table so that the operator will know where are the working limits of the circular saw. The work is then butted against a stop clamped to the table, and dropped down on the saw at the proper point, or fed to the saw the proper distance and then withdrawn. With measurements from the ends of the finished stretchers the mortises for them are laid out with a marking gauge, square and knife. Check and mark each one carefully as the work proceeds, so that all pieces will fit snugly.

Assemble the basket before gluing together to see that all parts fit snugly. (See Figs. 4 and 5.) Notice the blackboard sketch in the background with the names for all the parts listed as used in the stock bill. Glue the box part together leaving out the center partition. Lacquer the entire basket inside and out including the center panel and handle. With the center panel left out, it is easy to color the inside as there is plenty of room for the brush. The final coat on the ends is not given until the center partition is nailed and glued in place and all nail holes are filled. Thick orange shellac, powdered chalk and lacquer of the correct color are mixed to a thick paste and used for a filler. The lacquer helps in the drying process, gives color

FIG. 5. ASSEMBLING THE PARTS OF THE MAGAZINE BASKET.

to the filler and hardens the work very quickly. Do not spread the filler out much, but build it slightly above the surface. When dry, sand level with the surface of the wood. Give the ends a final coat and the work is ready to rub. This is done with a felt pad and fine powdered pumice and oil. The basket is now ready for the surface enrichment.

As each boy designed his own basket contour, so also he must make a suitable surface design to paint or stencil on the ends of his work. Figure 6 shows a seventh-grade boy at work painting a design. The two papers standing upright show the stencil for transferring the design to the basket surface, and a color scheme which the boy is following. Figure 7 shows the completed design painted upon the end. Artists' oil colors and brushes, including a few striping brushes, are used. The work of some of the boys is given to show how the designs have been developed. (Figs. 8, 9, 10, and 11.) All have one or more similarly shaped units. This is because the author limited the class somewhat in their designs so that all would have a definite, tangible something to begin with.

On the blackboard were drawn several spots or shapes, more or less irrelevant. (See Fig. 12.) It was pointed out that the spots could be made larger or smaller; in other words, the measure could be changed. Figure 13A shows that similar spots, gradually varied in measure, may be so grouped that a rhythmic movement is obtained

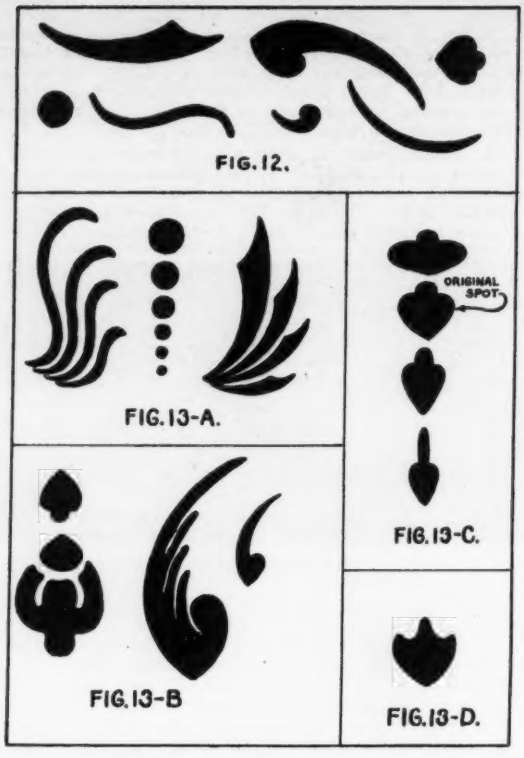
FIG. 6. PAINTING THE DESIGN ON THE MAGAZINE BASKET.

(Fig. 13B); that if any of the spots are greatly enlarged their areas should be subdivided or the spots may appear too large (Fig. 13C); that one measure, length or width, of a spot may be changed to accommodate a particular enclosure or place in a design (Fig. 13D); that if the contour of a spot is entirely changed it will make a different or new spot. All the spots of a design should be so placed that there is an interrelation of the parts; the areas should "fit" together so that unity for the assembly of the whole is the result as may be seen in the designs shown by Figures 8, 9, 10, and 11. For designs of this kind arrange the spots on one side of a central axis, that when the spots are transferred in their same relative positions to the other side, a balanced unit of design will be the result. Many examples to illustrate the points enumerated were sketched on the blackboard. All the examples, except the units to be used were erased before the class was permitted to begin work.

The color scheme should be carried out in tempera paint. Three types of color schemes were discussed: dominant, analogous, and complementary. A dominant color scheme uses one or more tone values or steps of contrast of a single color, as dark green, middle green, light green, etc. This combination of hues is somewhat monotonous. An analogous color scheme has greater variety and uses combinations very close in the scale of color values, as red, orange-red, and orange, etc. A complementary color scheme is one that uses values of a primary color, as red, yellow, or blue in combination with values of the two remaining primary colors mixed to form another color, as red and green, orange-red, and green-blue, etc.

Whatever color combination is used it is advisable to subdue, or gray, the hues, rather than to use them at full intensity. One or more small spots, points of accent in the design, may be near full intensity. A color may be grayed by mixing a small quantity of the complement of that color with it or by adding a little black. Great care should be taken not to add too much of the graying color or the grayed value will appear muddy. A small quantity of white added to all the colors used gives them a common quality of tone and makes

FIG. 7. THE FINISHED MAGAZINE BASKET.



ELEMENTS WHICH CAN BE EMBODIED IN THE DESIGN OF THE SURFACE ENRICHMENT FOR THE MAGAZINE BASKET. C. ANTHONY VAN KAMMEN.

harmonious tints of all the values even as graying made shades of the standard colors. Space does not permit going into detailed study regarding color and its application. The art department will be glad to cooperate in both the matter of contour and surface enrichment.

To transfer a design from paper to a finished surface perforate the outline of the design on paper with a pin point. The holes should not be more than ⅛ in. apart. Place the stencil where desired, then, with a blackboard eraser full of chalk dust, or with a tiny sack full of powdered chalk or whiting, slap lightly over the entire stencil. The fine particles of powder will find their way through the pin holes in the stencil and transfer the design.

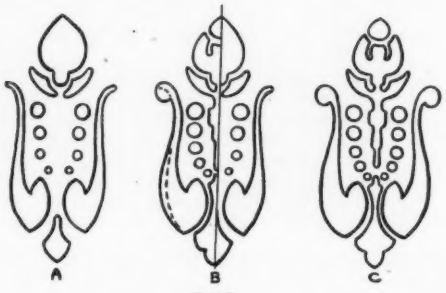


FIG 8

FIG 9

LATHE CENTERS
(No. 2 Morse Taper)

Geo. F. Johnson, Grand Rapids, Mich.

(See Supplement No. 78)

This pair of centers is made preferably of tool steel, common grade, so that they may be hardened and tempered when finished. They may, however, be made of mild steel and carbonized afterward to a depth sufficient for service, where one has the facilities for that heat treatment.

In either case the material furnished is ¾ in. round stock cut to the over-all length of 7⅜ in. as shown in the blue print. Note that the center holes are left in both ends of the finished work because there is nothing gained in removing them.

The first operation is to center the stock in both ends in the usual way by drilling ¼ in. deep with a ⅛-in. drill and then countersinking this hole with a 60-deg. countersink so that the top of the countersunk portion shall be not more than ¼ in. across. This operation may be done also with the combination drill and countersink which countersinks and drills the piece at the same time. The locating of the centers is done by means of a centering head and scriber.

Mount the piece between centers in the lathe with a suitable dog clamped to one end and put a drop of machine oil in the center hole of the other end. Adjust the distance between centers snugly. It must be neither too tight nor too loose.

Face both ends removing just enough metal to straighten the ends to right angles with the length of the piece. Then machine one end to a diameter of ½ in. for a length of ⅛ in. only as shown in the drawing. Repeat these operations on the other end of the work.

Now calculate the set-over of the tailstock needed for this given taper. The formula is:

$$\text{The amount of set-over} = \frac{\text{total length of piece}}{\text{length of taper part}} \times \frac{\text{difference between the 2 diameters of taper part.}}{2}$$

CAUTION: In calculating this taper, remember "total length of piece" means 7⅜ in. and "length of taper part" should be understood to man 2$\frac{15}{16}$ in. plus the ⅛ in. on the end which already has been turned straight.

Now set the tailstock of the lathe over the calculated amount. To do this, loosen the screw, or screws, that clamp the tailstock to the bed of the lathe, and then by means of the two opposed screws set the upper part of the tailstock over the desired amount toward the front of the lathe. When it is set over, be sure to clamp the tailstock tightly to the bed of the lathe again and have the opposed screws tight also.

Machine the taper on one end. Take small cuts and measure the taper to make sure you have the set-over correct. Do this before you take the finishing cuts. If there should be a correction needed, make it by changing the set-over. Then take another slight cut and measure again to be sure. Since this taper increases at the rate of .050 per inch of length, in two inches it will increase .050 × 2 = .100.

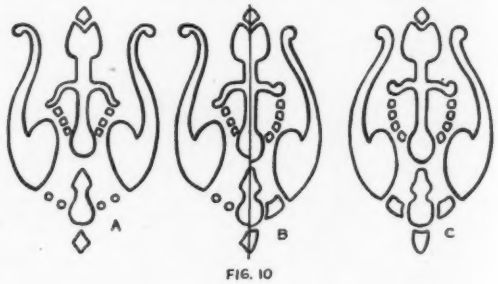


FIG. 10

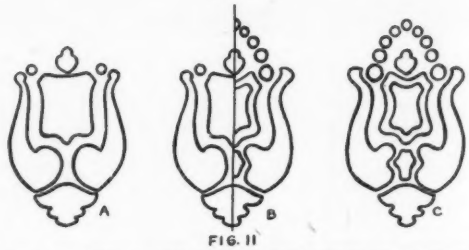


FIG. 11

FIGS. 8, 9, 10, AND 11 ARE SUGGESTIVE SURFACE ENRICHMENT DESIGNS FOR THE MAGAZINE BASKET. C. ANTHONY VAN KAMMEN

This will help you to check up on your taper before you have gone very far with it. Let the large end of the taper run out where it will. Repeat these operations on the other end of the piece.

When the taper turning is complete, lightly file and polish it to a finish between centers, the lathe running at high speed. Too much filing produces an inferior product. Round off the sharp edges at the small ends of the tapers with your file.

The work may now be taken to the power hacksaw and cut in half. If the power hacksaw is busy, it is no great job to cut the piece in half with a hand hacksaw.

Each of the two pieces may now be mounted in turn, in place of a "live" center in a sleeve that fits the lathe for machining the 60-deg. point as indicated in the drawing. This is done by loosening the two screws that hold the compound rest in place and swiveling the compound rest to a position 30 deg. to the right of horizontal. The upper and lower bases of the compound rest are graduated so that this angle can be set directly.

It will be well to remove the driving plate from the spindle nose at this point for the operation to follow. Then with the tool mounted at right angles to the angle of the compound rest slide, and the tool point set to the height of center, proceed to machine the point to 60 deg. using the hand-feed handle at the rear of the compound rest. CAUTION: Do not try to use the automatic feed on this operation.

When the 60-deg. point is finished on the one piece, make a deep center-punch mark on the circumference of the work that will match closely with the similar punch mark in the sleeve and in the end of the lathe-spindle nose. The purpose of this mark is to insure that the center will always be mounted in such a manner that it will run perfectly true.

Repeat the above operations on the remaining piece.

Finally, remove the work to a bench and stamp both pieces NO. 2 MORSE TAPER in the location indicated in the blue print.

"The ideal workman is that man who likes his work and who gives a maximum product of quality and usefulness with a minimum of time and material."

A BAND SAW BUILT IN A SCHOOL SHOP

N. F. Bleakley, Grant High School, Cedar Rapids, Iowa

The city of Cedar Rapids, Iowa, needed a band saw for one of their junior high schools.

Having ample equipment in Grant High, it was decided to build a 20-in. band saw there. The saw was to be made as a school project.

The unusual nature of this project, calling for the cooperation of the members of all the departments, produced keen interest on the part of the students. It was a project wherein every member of every department had a hand. Each department was eager to know how the other departments were progressing and watched developments day by day. Boys, who heretofore had little or no interest in industrial arts, enrolled in shop courses for the year 1926-27. The year's enrollment exceeded any of the past several years. The boys brought in their schoolmates and parents and pointed with pride to the different parts of the new saw upon which they had worked.

PATTERN, FOLLOW BOARD, AND CORE BOX FOR SAW FRAME.

A project of this kind, cuts the discipline problem to a minimum because one boy's work depends upon that of another and there is no time for play. In order to keep a boy busy he must have something very interesting to work on. This project interested each and every one of the students.

All departments worked under the system employed in industrial plants. This gave the boys inside information on how large plants route their work from the drafting room through to the assembly room. It also taught them what to expect should any of them choose as a lifework any of the courses taught at the school.

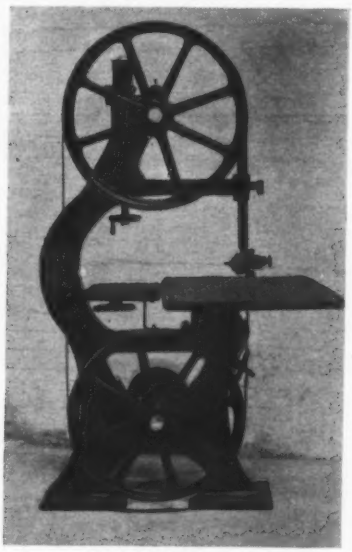
Specifications:

Frame 8½ by 28 in. by 5 ft. 7 in.
Table 19¼ by 23½ by 38 in. high, tilt 15 deg. left and 45 deg. right.
Capacity:
18 in. from saw blade to column, 7¾ in. under the guide.
Auxiliary table, 8½ by 9 in.

THE OPEN MOLD SHOWING THE CORES IN PLACE, GATES CUT AND READY TO CLOSE THE COPE.

Wheels, 20 by 1¼ in.
Wheel shafts, 1 in.
Upper bearing, 8 in.
Lower bearing, 8½ in.
Guide post, 1 in. sq., 3-in. bearing.
Saw blade, 10 ft. 6 in., to 11 ft. 3 in., by ¼ to ¾ in. wide.
T. & L. pulleys, 8 by 3 in., 700 r.p.m.
Screw adjustment for tightening saw on dovetailed ways.
Tracking device for tracking blades.
Floor space, 26 by 36 in.
Power, ½ to 1 h.p.

Designing. Two boys were appointed as chief draftsmen to work out the main ideas of the saw. They were given the general dimensions wanted, and they sketched it to scale on blocked paper making notes on the different parts. These chiefs had several boys under them who acted as assistants and each assistant had several boys under him. The chiefs apportioned a particular part of the saw to each assistant and he had his crew work out that particular part in detail. One assistant had charge of the upper-bearing construction, another the lower-bearing, etc. The chiefs saw to it that the assistants were doing their work correctly, and the assistants did likewise to the boys under them. After all detailed drawings and tracings had been made, the boys made assembly drawings and tracings of the different assembled parts, and also of the complete saw. They had to bear



FRONT VIEW SHOWING TABLE AT 90° WITHOUT GUARDS OR SUB-BASE.

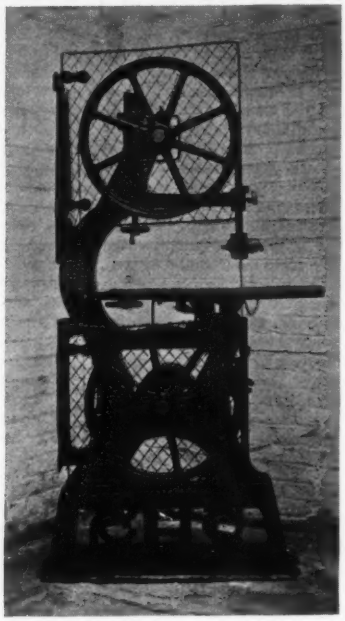
in mind the capacity of the machines in our machine shop, and so design the parts that could be made on our machinery. They enjoyed this and spent every minute of the drafting period at their work. The boys felt that they were getting practical experience which was better than working on a set course of drawing. Before they were half finished with the saw, they wanted to know what they could design next.

Making the Patterns. A patternmaker's layout was made of the saw frame by two boys who were appointed to do this particular job. The layout was made so that the frame pattern could be made in sections. This enabled several boys to work on the frame pattern at the same time. Then all the sections were completed, the frame was fitted and glued together. The pattern was made solid with the parts in the cope left loose so that it could be more easily molded. The same crew of boys made the core boxes for the frame while several made the following board and flask. The core box is a full box with a bedding box where the arm tapers to the guide-post bearing. The sub-base was also made as a group project. It was made to be cast all in the drag with a cover core. It is an open frame with the letters G. H. S. in the open space. The letters are flush with the sides and were put in the core box as the core came flush in the open work against the green sand.

The smaller patterns such as the wheel, pulley, table, etc., were made individually by the remainder of the class. Making these patterns required a good deal of individual instruction but at the same time the boys had a chance to observe a number of different types of pattern work, involving different constructions, partings, coring, etc.

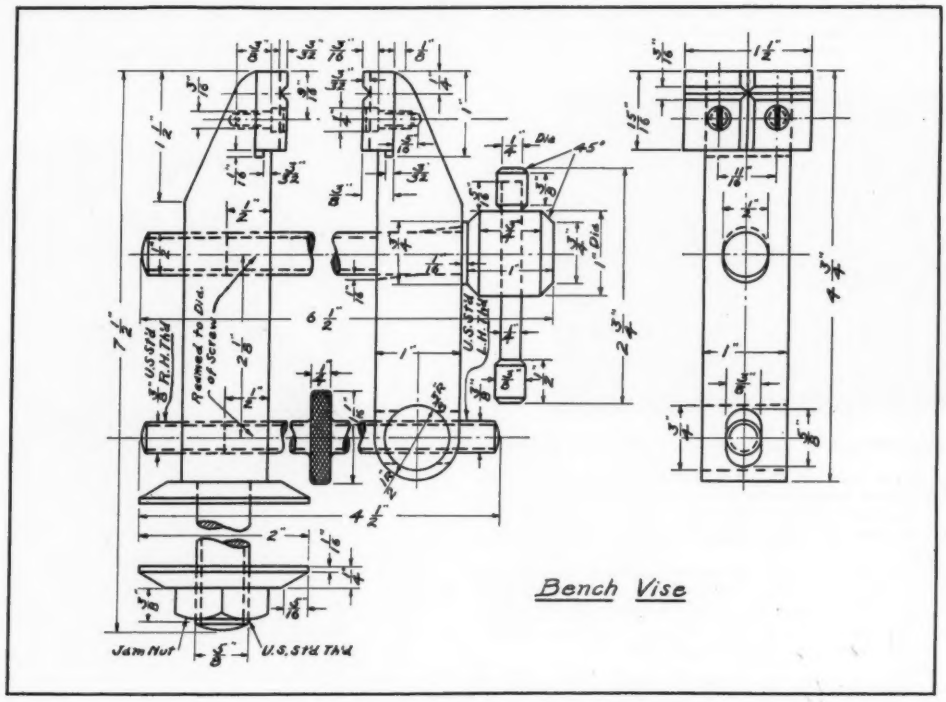
Molding and Founding. The flask for the saw frame was 3 by 5 ft. with a 6-in cope and drag. The cope and drag when rammed each weighed approximately 600 pounds. The drag was rammed and rolled and the parting made. Three half-inch sprues were placed at the lower part of the pattern and two at the guide-post bearing for relief of the core gas. This method was used because a large core must let the gas off quickly or the casting will blow. The cope was set in place and four sprues and a riser located between the bars of the cope. Two sprues were at the lower end or feet of the frame, one at the guide-post bearing and one at the upper-bearing bracket. A riser was placed at the surface upon which the table rests. This was so placed to relieve undue strain on the arm in cooling. After the cope was rammed it was lifted with a crane. The frame was poured with four ladles—two bull ladles and two hand ladles. The bull ladles were used at the lower part where the most metal was needed. The metal around the core was ⅜ in. thick and the casting weighed 185 pounds. The wheels and table were rammed in specially built flasks and the remaining small parts were rammed and poured in snap flasks. The bearings were rammed in pairs in snap flasks and poured in bronze. The name plate was poured in brass.

Machining. Quite a number of special tools had to be made in order to machine this project. An inserted tooth end mill was made to machine the feet of the frame. The frame was laid on its side on the platen and fastened down while the feet were machined with the aforementioned end mill. This became the working face and all dimensions were taken from here in order that every part would fit perfectly. The end mill was then removed and a drill inserted in

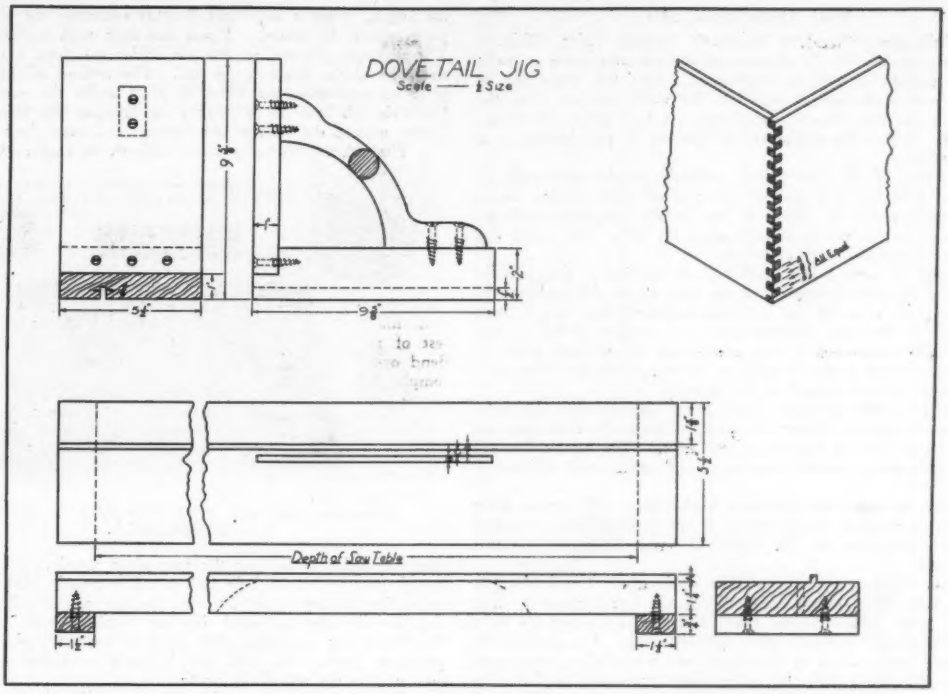


FRONT VIEW SHOWING SAW FULLY GUARDED.

the spindle with which four holes were drilled in each foot. The frame was then set on its feet and bolted on the platen with the drilled holes lining up with the T slots in the platen. The bearing housings were then faced and bored. It was again laid on its side while the dovetailed ways for the upper bearing were milled. The



BENCH VISE, DESIGNED BY ARTHUR F. AHR, WOODLAWN, PA.



DETAILS OF DOVETAIL JIG, DESIGNED BY O. R. JOHNSTON, LOS ANGELES, CALIF.

frame was then taken to the planer and the surface for the table was planed. If our miller had been large enough, this planing could have been done on the mill with the same set-up as the one for boring and facing the bearing housings. While the frame was being machined other boys were machining the wheels, pulleys, table, bearings, arbors, etc. After all the parts were machined, the saw was assembled and run in.

Lubrication. All bearings throughout the saw are of bronze. The upper bearing is lubricated by force-feed grease cups. The lower bearing is of the oil-ring type with a large oil reservoir. The loose pulley is lubricated by a force-feed grease cup screwed into the end of the shaft.

BENCH VISE

Arthur F. Ahr, Harding High School, Woodlawn, Pa.

The bench vise at first glance gives the impression of a difficult project, but after a detailed study, it simplifies itself into a number of wide-reaching problems, containing fundamental operations well within the ability of the average vocational machine-shop student. The bench vise immediately attracts the attention of the boy, and when it is completed he feels the joy of accomplishment and has a useful tool for the home workshop.

It provides operations for the lathe, shaper, milling machine, drill press, and universal or surface grinder, as well as benchwork and heat treating. The materials may be machine steel throughout, but preferably carbon tool steel should be used for the jaws. The machine-steel parts are case hardened, and the jaws are hardened and drawn to a dark straw or purple. The body of the vise and face of the jaws may be ground, polished or mottled.

In operation the vise is similar to the parallel clamp used by machinists and toolmakers but instead of the usual type of lower screw, it has a centrally operated screw with a right- and left-hand thread to aid in keeping the jaws parallel. The movable joint at the bottom permits more rapid and convenient adjustment.

A DOVETAIL JIG

O. R. Johnston, Roosevelt High School, Los Angeles, Calif.

This device was constructed to make corners on filing boxes easily and quickly. The drawings as to the construction of the jig are self-explanatory. It should be made of hardwood, and all parts should be fastened together with glue and screws.

To cut slot through bottom:

1. Lay out slot. It is very important that the distance C, is equal in width to the cut made by the dado head.
2. Clamp the jig to saw table with dado head down.
3. Start motor and raise the dado head slowly and cut slot.
4. Set dado head to project above board a distance equal to the thickness of the stock used in making the box.

Operation of Jig:

1. Put witness marks on one edge of each piece used in making the box.
2. (To cut front and back pieces.) Put edge of stock against fence D, and make first cut by pushing it forward. Hold stock perpendicular with the pusher which slides on fence D.
3. Straddle the fence with this slot and make a second cut.
4. Continue the operation, always using the cut made as a guide for the next one.

DOVETAIL JIG, DESIGNED BY O. R. JOHNSTON, LOS ANGELES, CALIF.

5. The two sides are started in a different manner. Measure for the first cut from the marked edge a distance equal to the size of the first tenon on the other piece.
6. Make this cut and proceed as before. If distances B, C, and D, are equal, the result is a perfect job.

This device can be used to make any size cut, the only requirement being that the distance C, be the same width as the cut made by the dado head.

WRITING-DESK SET

J. W. Bollinger, Theodore Roosevelt School, Tulsa, Okla.

Here is a project for the sheet-metal student who wants to make "something useful" as well as ornamental. Boys will make one or two pieces, and then plan to complete the whole project. For the lad with individuality, there is opportunity on each article for a personal touch. When the whole set is finished in polychrome, it is indeed attractive.

The making of the pen tray is perfectly simple, and needs no explanation. Use IX coke tin for this and all other pieces. Some boys, who were unable to afford to pay for the materials, made acceptable pieces out of tin from half-gallon tin cans. The paint and finish covers all discolorations in the tin.

The piece of next greatest difficulty in making is the calendar mount. (It is advisable to begin with the easier pieces, for nothing succeeds like success; after the lad has made a few articles, he will more quickly attempt the more difficult ones.) It involves a bit of easy soldering. The dimensions of this article may be changed to fit the calendar that is to be mounted upon it. It is a good plan to secure a calendar which is large enough to be readable.

The letter opener or paper knife offers no particular difficulty. For the sake of rigidity, all but the point is hemmed. This does not interfere with the cutting qualities of the knife. The handle is made of three thicknesses of metal folded over each other, and soldered at the edge.

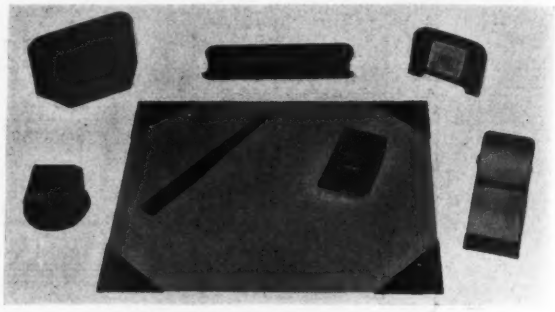
It is best to make the stationery holder next. The center piece will need to be soldered to the center of the bottom, before bending the front and the back up. Be careful to bend the bottom, so that it will set level.

The four blotter corners should be made next. Check the patterns with each other, before bending. Shape over a piece of sheet iron $\frac{1}{16}$ in. thick. Make certain, again, that the four pieces are alike.

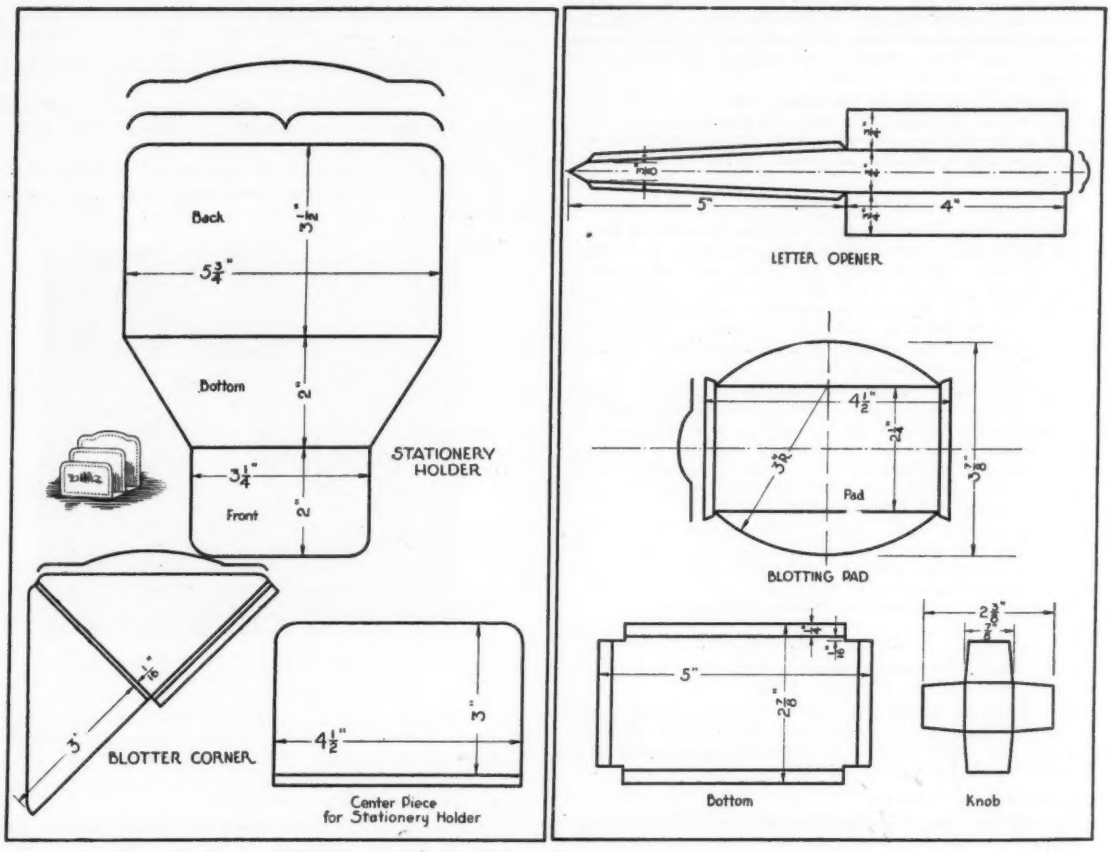
The blotter pad begins to offer some difficulty. The ends of the part marked "pad" should be bent back over a specially shaped piece of iron, so that these ends will follow the same curve as the sides. A tiny drop of solder should be put on each corner. The knob should be made next; note that the sides slant inward a little, instead of being straight. These edges may be soldered shut or not, depending on the student. The knob is soldered in place by what we call "puddle soldering." Hold the knob in place on the pad with the finger. Place a large cold drop of solder on the place where the pieces are to be joined. Touch the drop with a clean hot copper. Tilt the pad sideways, so that the solder will form a puddle joining the edge of the knob to the pad. The bottom of the blotting pad is to be removable, and snaps in place under the ends of the pad. One-sixteenth inch is to project out beyond the sides. Bend the blotter around the ends of the bottom, and snap the whole in place.

The ink-well cover is fairly difficult to make. Care must be used, in order to lay out the four sides exactly. After laying out, punch out the 1¼-in. hole with a hollow punch. Bend up the sides until the slanting edges fit, and "puddle solder" them. Bend the rest of the sides up until they are straight, and "puddle solder." Bend over the curved sections marked "bottom," which will form a complete circle. The ambitious boy will work out a hinged lid to put on over the top of the bottle.

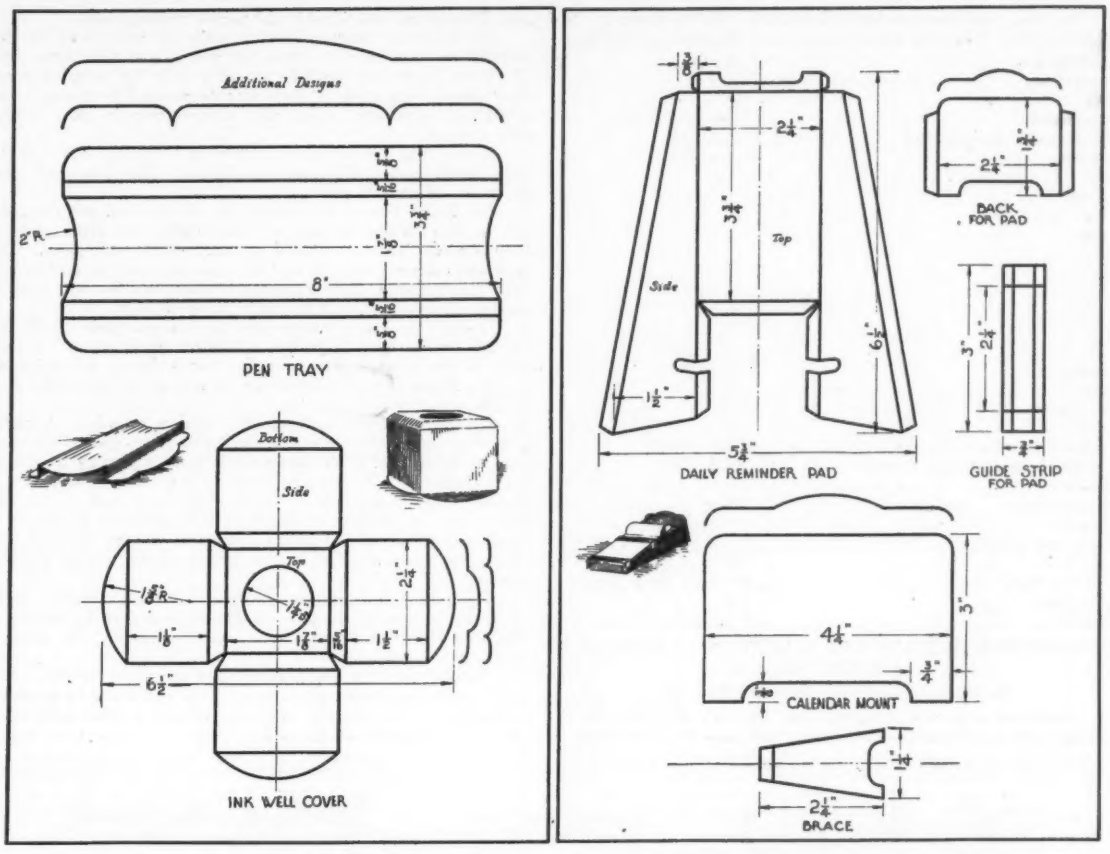
The daily-reminder pad is the most difficult and yet the most interesting piece in the set. The "works" consist of a roll of paper such as is used in adding machines. It is mounted by means of a rod or nail, running through the center of the roll, and resting in the slots cut for it. Cut the slots after everything else has been done.



WRITING-DESK SET, DESIGNED BY J. W. BOLLINGER, TULSA, OKLA.



DETAILS OF WRITING-DESK SET, J. W. BOLLINGER, TULSA, OKLA.



DETAILS OF WRITING-DESK SET, J. W. BOLLINGER, TULSA, OKLA.

The slots are made by first drilling holes where the bottom of the slot is to come, and then finished by cutting away the tin, down to these holes, with the tinner's snips. One guide strip is to be placed near the upper end of the part marked "top," and one near the bottom end. They serve to guide the paper down over the "top." As the paper is used, it can be torn off at the bottom, and more unrolled.

On the drawing is shown at least one variation in design, which may be applied to each article. Other simple variations can be worked out by the pupils.

In putting on the finish, two procedures may be followed. One is to mix the bronzing powder with banana oil, and paint each article with the mixture. This will then serve as a background, upon which the other colors are to be blown. Another procedure is to secure some bright-colored enamel, as red or green, and putting this on to serve as background. We have found the second method to work out very well indeed. The simplest way to put on the other colors is to make a sort of trough out of a piece of tablet paper, place a small quantity of the bronzing powder in this trough, and blow it on at random, here and there. Take another color and proceed in like manner.

The most attractive color combinations that we have used are a red or green enamel for background, and deep-gold and royal-purple bronzing powders.

MARTHA WASHINGTON SEWING CABINET

Jos. J. Lukowitz, Milwaukee, Wis.

(See Supplement No. 79)

The Martha Washington sewing cabinet, unlike some other time-honored furniture designs which have been perpetuated largely for the sentiment connected with their history, is a decidedly practical and beautiful piece of furniture which will appeal to any girl or housewife. The cabinet contains plenty of room in which to keep all of the sewing paraphernalia as well as the odds and ends of material which accumulate and which the thrifty woman likes to keep in her sewing nook.

The construction of this sewing cabinet is a work of precision and should not be attempted until an accurate full-size working drawing is made. The sizes and angles of the staves which make up the end pockets should be taken directly from the full-size working drawing. Accuracy in determining and in cutting the angles on the end-pocket staves cannot be overemphasized for the least deviation from the correct angle will cause the whole construction to vary in size and shape. Glue blocks should be used to aid in clamping the end staves together and a trial assembly should be made to insure a perfect fit before gluing. When cutting the groove in the staves for the spline, a jig is required, for if the sharp edge of the staves is run against the ripping fence it may catch or run under the fence and spoil the piece. Even though the sharp corner did not catch between the ripping fence and saw table, it would be very difficult to hold the piece at the correct angle throughout the cut. The jig may be made of any cull stock and it is a good problem to test out the initiative and resourcefulness of the student. The frames may be joined with short dowels or with a short tenon and a corresponding groove cut in each end of the rails. If the frames are doweled to the legs they will make a practical and an adequately strong construction. The sliding tray suggested in the drawing may be made and divided into compartments to suit the particular requirements of the user. The top molding is easily made with circular saw and rabbet plane, or entirely with a rabbet plane, and although this molding may be omitted, it adds much to the pleasing appearance of the interestingly shaped top.

Mahogany, walnut, birch, or gumwood are suitable woods to use for this cabinet and a dull varnish finish, or a rubbed varnish finish is recommended; but when lack of time or proper facilities does not permit the application of such a finish, a shellac waxed finish, or a lacquer finish may be applied. Occasionally we find these cabinets painted or enameled but the preference is for a transparent finish.

CHART OF TERMS FOR THE MECHANICAL-DRAWING ROOM

John F. Faber, Erie, Pa.

(See Supplement No. 80)

The average text and course in mechanical drawing treats terms when they occur on the drawings being made. Seldom is a summary of these terms made for ready reference. The accompanying chart is an attempt to cover the more common terms used in connection with the average school drawing and might prove of interest to mechanical-drawing teachers.

This chart consists of a collection of machine parts each calling for different terms.

The reproduction of this chart should not be required but if the chart is placed in a reference notebook, accessible at all times, much time and effort on the teachers' and students' part will be saved.

The terms and their standard abbreviations, also are shown in the following table. Where no abbreviation is used, the space is left blank.

Finish all over	F. A. O.
Finish	f
Drill	
Countersink	C'sink or C'T'SK
United States Standard tap	U.S.S. Tap
Diameter	Dia. or Diam.
Lug	
Keyway	
Core	
Ream	
Bore	
Rim	
Hub	
Turn	
Web	
Fillet	
Crown	
Boss	
File Finish	
Knurl	
United States Form Thread	U.S.F. Thd.
United States Standard Thread	U.S.S. Thd.
Serrate	
Counterbore	C'bore
Chamfer	
Grind and Polish	
Cast Iron	C.I.
Machine Steel	M. S. or Mach. Steel
Tool Steel	T.S.
Radius	R or Rad.

DECORATIVE DESIGNS FOR CHRISTMAS CARDS AND CALENDARS

D. Elizabeth Roberts, Philadelphia, Pa.

Attractive cards and calendars may be made at little cost by anyone who is interested in handicraft and who likes something a little different and individual in the way of greeting cards.

Art paper or cardboard, either white or tinted may be used, with the design outlined in India ink and painted with water colors. The tinted papers are especially attractive, with the design in opaque water colors. Any color or shade may be obtained by mixing a small quantity of color with white. The lettering may be done in black, color, or gold.

Design No. 1 makes an attractive card with the red poinsettia, holly berries, and candle, and green leaves. The flame and candle holder can be done in gold.

For design No. 2 the coloring in the sky and the foreground may be very brilliant in tones of blue, purple, and yellow, with the stars in gold. The trees should be tinted lightly with green. These cards and calendars are improved by a narrow border of gold or color. This can be easily done by laying a plain card on top, leaving a narrow edge, then running the brush along the edge.

Design No. 3 is attractive with the red and green of the holly and the borders done in gold or a metallic red or green. The little scene in the center with its blue sky, brown church, and foreground of snow stands out well against the coloring of the remainder of the design.

Design No. 4 may be used for a card or calendar. A greeting lettered in the panel for a card or the words "The Season's Greetings" with a calendar pad in the center would make a pleasing calendar.

Design No. 5 is especially suitable for a calendar, although with a short verse or greeting, it can be used as a card. The stencil design may be inked in as shown in the illustration or simply outlined and colored red and green. Instead of drawing the head in the center, the circle may be cut out and a picture pasted under the opening.

Design No. 6 is suitable for either a card or calendar. Instead of inking in the berries as in the design, they may be painted red. The little scene looks especially well on tinted paper, with touches of white for the snow.

Design No. 7 is easily colored with a tint at the horizon, a brown or red house and bright green trees. This would also be suitable for a calendar, if the greeting were omitted and a small calendar pad pasted at the bottom of the card.

DESIGNS FOR CHRISTMAS CARDS AND CALENDARS. D. ELIZABETH ROBERTS.

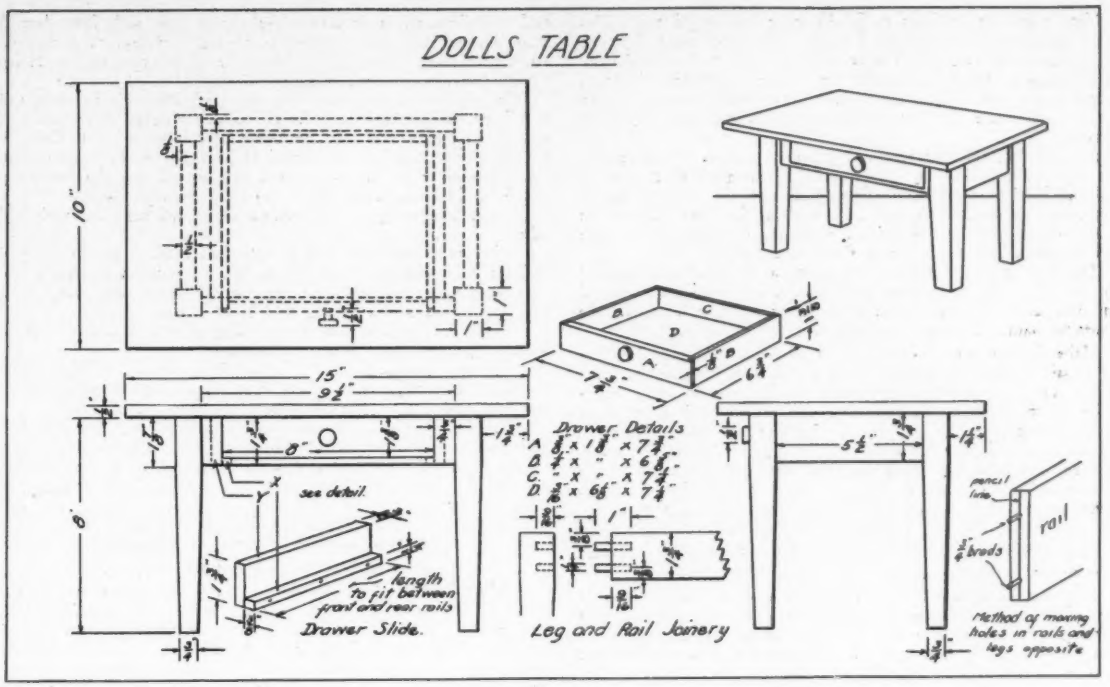


FIG. 1. DOLL'S TABLE, DESIGNED BY LEON H. BAXTER, HUDSON, OHIO.

For design No. 8, several color schemes may be used. Of course the poinsettias should be red and the leaves green, but the long lines of the design may be done in brown, gold, or some metallic color, which comes in small pans like the gold, or may be made by mixing a color with gold. A metallic green would be good for the background around the lantern, with the inside of the lantern either yellow or gold. The mistletoe may be in green with white berries, or both leaves and berries in gold.

Envelopes to match the cards may be made of heavy paper, cutting the pattern from a machine-made envelope.

THE PLYWOOD CONTEST

The great interest shown by the teachers of industrial arts in the contest announced by the Algoma Panel Company has been astounding. Drawings were received from all parts of the United States.

The drawings of suggestive problems and projects, in which plywood could be used had a wide range. It extended from small toys made in the elementary grades up to intricate problems involving construction for the high school.

The designs which have been submitted, give evidence of the application of much thought to beauty of line and details of construction.

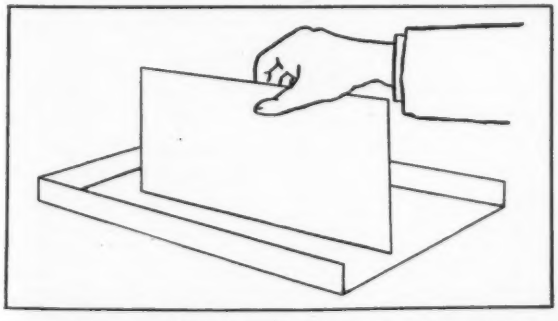
Everyone who has submitted a design in this contest, will receive a book which contains the 100 best projects arranged for elementary schools, junior high schools, and senior high schools.

This chart by no means exhausts the list of terms used on drawings but covers fairly well many of those most commonly used in schools.

FASTENING FOLDED SHEETS TOGETHER

John C. Carnwright, Theo. Roosevelt Jr. High School, Amsterdam, N. Y.

Quite often printing instructors have need for fastening folded sheets of paper together such as programs, school papers, etc.



FASTENING SHEETS TOGETHER, JOHN C. CARNWRIGHT.

Uusually some form of a staple binder is used for this operation. However, in some school shops the equipment does not include a staple binder, or, if there is one, it may be temporarily out of order. In such a case, the following procedure proves very satisfactory:

Take a flat, shallow dish or tray of some sort and just cover the bottom of it with thin mucilage. Next run the edge of the sheet which is to be inserted through the mucilage as shown in the diagram and insert it in the sheet to which it is to be fastened. Let it stand until dry and it will be found that the mucilage will not smear.

A galley may be used to hold the mucilage if no other dish is available but, of course, care must be taken to be sure the galley is absolutely dry after the mucilage has been cleaned off, so that the metal will not rust.

DOLL FURNITURE

Leon H. Baxter, Hudson, Ohio

Doll Table

This is an interesting piece of doll furniture which is not difficult to make.

First, make the four legs out of pine, basswood, or whitewood, 1 by 1 by 8 in. After planing them smooth all over and being sure all four are equal in length, measure 1⅞ in. from one end of each leg and square a light line around all four sides. From these lines the legs should be planed to a taper of ¾ in. as indicated on the drawing, tapering all four sides equally.

Next make the two side rails, ½ by 1¾ by 5½ in. After these are finished square and smooth, we are ready to start the assembly of the two ends. The rails are to be joined to the legs with ¼-in. dowels, 1 in. long, as shown in the detail drawings. In each end of the rail draw a pencil line exactly in the middle and on this line, ⅜ in. from each end, drive a ¾-in. brad. (See sketch in lower right-hand corner of Fig. 1.)

With a pair of pliers cut these brads so they project about ⅛ in. from the wood. Place the top edge of the rail flush with the top of the legs and at a point as far from the edge as will bring the edge of the rail ⅛ in. from the edge of the leg. This is shown in the top view of the drawing. Press down lightly on the rail and this will leave an imprint of the brad on the legs directly opposite the same points on the rail. Remove the brads and using the marks bore holes with a ¼-in. bit, ⅞ in. deep.

Bore these very carefully, taking pains to make them straight. The dowels are cut 1 in. long, which is ⅛ in. less than the combined depths of the two holes.

Glue the dowels and rail ends and clamp each pair of ends together. While these are drying make the rear rail ½ by 1¾ by 9½ in. and make the front rail an exact duplicate. On the front rail, measure ¾ in. from each end and square a light line across the wood. Measure up ⅜ in. from lower edge and draw a line parallel to the lower edge and running between the two lines previously made. Saw out this piece, for the drawer.

Next make drawer front to fit the space just sawed out. This will be practically ⅜ by 1⅜ by 7¾ in. The two drawer sides are made ¼ by 1⅜ by 6⅝ in. The drawer end is ¼ by 1⅜ by 7¼ in. The two sides B, are jointed to the front A, in the manner shown in the sketch, the front being sawed carefully to make neat joints with the sides. Assemble the four drawer parts with glue and ¾-in. No. 18 brads.

If all cutting has been accurately done the bottom should be next made $\frac{1}{16}$ by 6⅛ by 7¼ in. This should fit snugly, and it is to be glued and bradded carefully in place, flush with the bottom edge of the drawer. A small knob may be turned on the lathe, or whittled out of a round stick, to the dimensions shown, and glued in the hole bored to receive it in the center of the drawer front.

The next step is to prepare and assemble the front and rear rail with the table ends in the same way as the ends were prepared and assembled. Glue and clamp carefully. While the glue is drying, the top may be made. It should measure ¼ by 10 by 15 in.

Make the two sets of drawer slides as shown in Figure 1. One piece should measure ⅜ by 1¾ in. by the distance between the front and the rear rails, and the other piece should have the same length but be ¼ in. thick by ⅜ in. wide. Glue and brad these pieces together, using ½-in. No. 18 brads. Remove the clamps from the table and attach the drawer slides, with glue and 1-in. No. 18 brads. The slides should be just flush with the lower and side edges of the drawer opening. Try the drawer and see if it slides freely. If so, attach the top with 1-in. No. 18 brads and glue, allowing a projection of 1¾ in. at each end and 1¼ in. at front and back.

Next carefully set all nails about $\frac{1}{32}$ in. with a nail set, and fill the holes with beeswax, applied with a knife. Sand smooth.

The table may be left unfinished, but a better way is to apply a coat of flat white and allow it to dry over night. Sand lightly with fine sandpaper, and apply a coat of white enamel. When this is dry it may be left glossy or rubbed to a satin finish with pumice stone and water, and a burlap pad.

DOLL CHAIR

Two of the chairs, shown in Figure 2, will go very nicely with the table shown in Figure 1.

About 8 ft. of wood, finished ⅞ in. square is sufficient to construct the two chairs.

The chairs are made as follows:

The material is sawed out a little larger than the finished size of ⅛ in. on a side, to allow for squaring and planing. The two back pieces are just 12 in. long, with the top filed to a $\frac{1}{16}$-in. chamfer. The front legs are $4\frac{1}{16}$ in. long. The front and rear rails are 3⅛ in. long. The two lower side rails are 3½ in. long and the two upper side rails 4⅛ in. long. All pieces must be exactly square on the ends to make a perfect butt joint. The two upper side rails A, are sawed half way through, as shown, to make neat joint with front legs B. Bore the necessary holes in the front and rear legs to receive the assembly screws. These holes should be $\frac{5}{16}$-in. diameter to receive 1¼-in. No. 8 round-head blue screws.

In assembling the parts, first glue and brad the top side rails and front legs, using ¾-in. No. 18 brads. A screw enters the back end of the upper side rail, the screw hole being $4\frac{5}{16}$ in. from the bottom of the rear leg. It should strike fairly in the center of the rail. The lower rail is next screwed in place, so that the lower edge is 1¼ in. from the lower end of the front and rear legs.

After assembling each individual side, join the sides with each other.

The front and back rails are attached 2 in. from the leg ends and are held with glue and 1¼-in. No. 18 round-head blue screws.

Next make the two pieces for the chair back, one being ⅜ by 1⅜ by 3⅜ and one ⅜ by 2½ by 3⅜ in.

These are attached, as shown, using glue and 1¼-in. No. 18 brads. Space these as shown in Figure 2.

The seat is made ⅜ by 4⅞ by 5¼ in., with the top edge slightly rounded. Notch the rear corners so as to fit snugly between the rear legs and allow a projection of $\frac{5}{16}$ in. at the front. Nail in place.

Set all brads and fill nail holes with beeswax. Sand carefully and apply an undercoat of flat white. After drying over night, sand lightly with fine sandpaper and apply a coat of white enamel which may be left glossy or rubbed down to a smooth luster with pumice stone and water.

TOYS AND THE SHOP

Charles M. Rice, Everett, Washington

Discussions and Suggestions

After the small boy, working with keen interest, has sawed, sandpapered, and assembled a toy for baby brother, his next desire is to "paint it." At this point, neither the interest of the boy nor the interest of the instructor should be allowed to lull. A well-decorated toy turkey is just as proud of its appearance as its most animate prototype. Since the major part of human interest is derived from ocular impressions, the boy knows what he wants but does not know how too add the final touch. Should the instructor take the time and trouble to produce toys as attractive as the toys of the shop windows? The small boy answers the question by working harder than ever to attain that standard.

Finishing Materials

Water Colors

Water colors have some advantages over oil colors when used in the school shop.

A. They are not as expensive as oil paints.

B. With water as the medium, many difficulties are avoided when paint is spilled in the room.

C. If through carelessness the brushes are allowed to harden, the

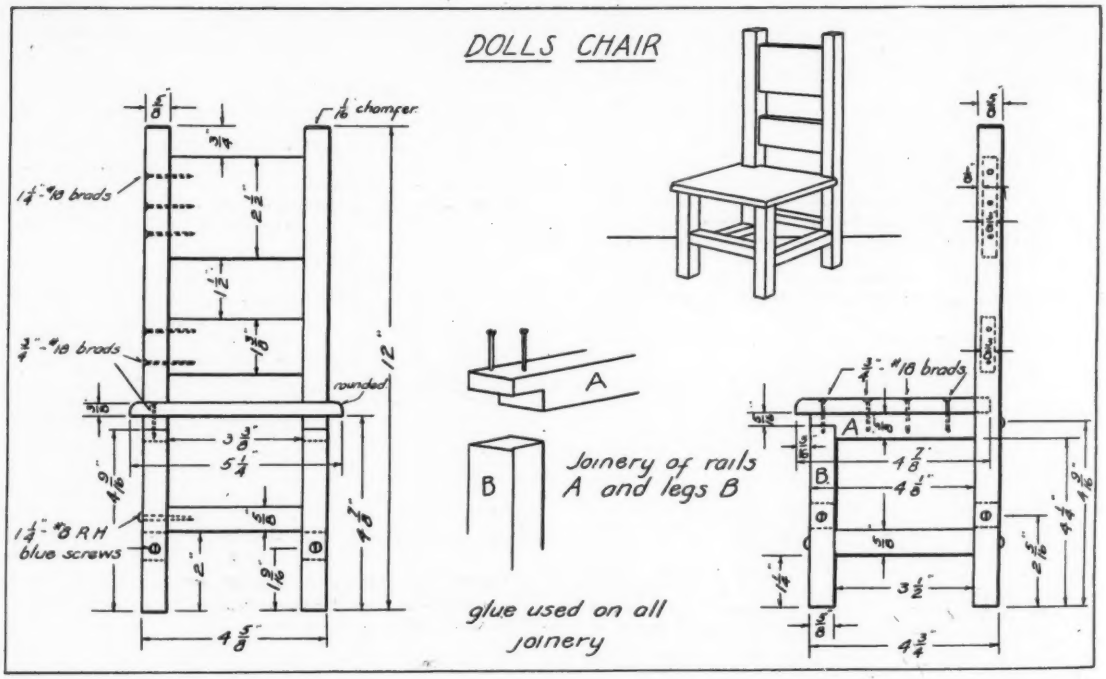
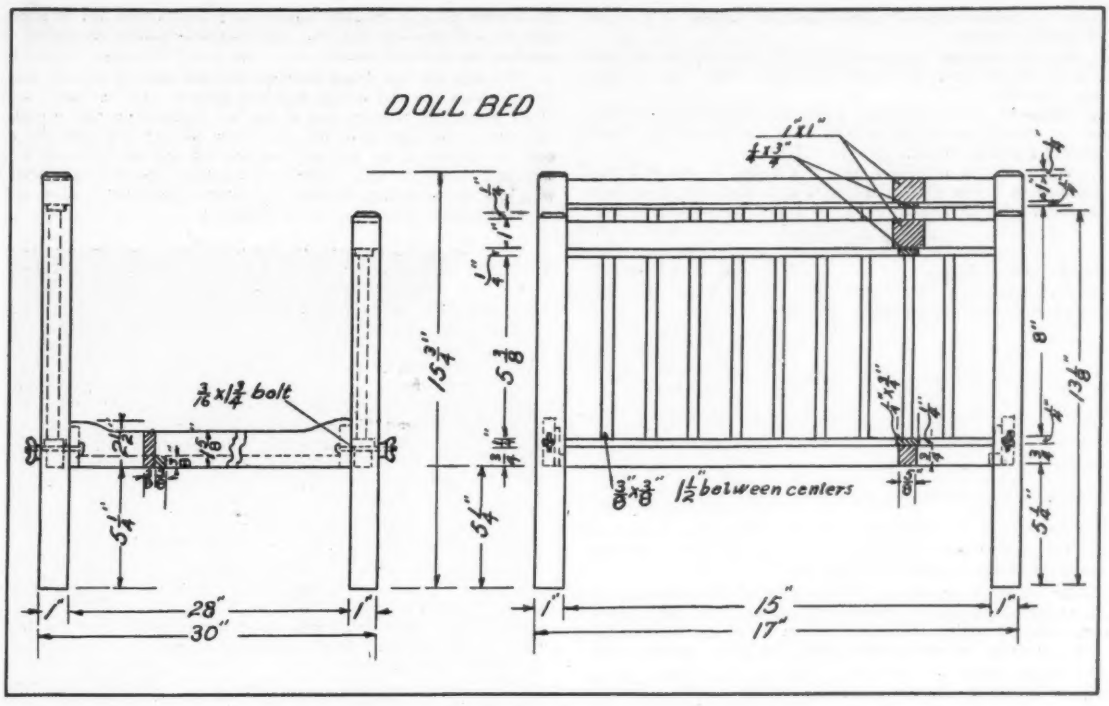


FIG. 2. DOLL'S CHAIR, DESIGNED BY LEON H. BAXTER, HUDSON, OHIO.



DOLL BED, DESIGNED BY C. C. SINCLAIR, AUBURN, N. Y.

chances of spoiling them and the difficulties of cleaning are not as great as when oil paints are used.

D. More easily cleaned from clothing than oils.

Tempera

Show-card colors should be applied to new surfaces only, i.e., surfaces without oil.

More white should be purchased than other colors in order to get variety of shades.

Toys are more attractive when painted in pastel shades and accented with spots of bright color.

Shellac or varnish, for protection.

Calcimine

This is quite inexpensive. Buy white calcimine. Color with dry pigments or show-card colors. Add a mixture of liquid glue and water for size. Do not use on oiled surfaces. Cover with shellac to protect the surface.

Water Stains

May be used to good advantage on many toys.

Red and green are the most useful.

Oil Colors—Enamels

Enamels are expensive. Should be used to best advantage.

Buy white and black only, for the sake of economy.

Color with oil pigments. These may be purchased more cheaply in the "decorator-size" tubes.

Gesso

Many interesting effects may be obtained with the use of gesso for ornamentation.

Gesso may be purchased ready made or it may be made in the shop.

1. Gesso for surfaces.

In order to gain a smooth surface and to cover the grain in one coat, a mixture of whiting and glue size will do.

2. Gesso for relief work.

2 Tbsp. Varnish.
8 Tbsp. Linseed oil.
12 Tbsp. Liquid glue.

Pour the glue, linseed oil and varnish into a pan and let it soak. Next, take about twenty tablespoonfuls of whiting, and mix it with cold water to the consistency of thick cream.

Pour the two mixtures together and boil ten minutes in a double boiler, over a slow fire. When finished, pour into an open-mouthed bottle and cork. If relief paint is desired, dry pigment may be added to the whiting while mixing, or coloring liquids may be mixed in when finished.

The Use of Stencils

There should not be any objection to the use of stencils in decorating school toys. Good designs may be developed on paper by the pupils. The design is then transferred to sheet metal and cut out with a wood chisel. This is done on the end of a hardwood block. Small knobs placed at two edges of the stencil make it easier to lift the stencil from the decorated surface. Separate stencils may be made for each color to be applied.

Bronze paints are very useful for stenciling because they dry quickly. If show-card colors are used, it is well to place a piece of screen over the stencil to prevent the water color from crawling.

DOLL BED

C. C. Sinclair, Auburn, N. Y.

The doll bed is a project that requires very little material. Practically all the stock may be taken from the scrap material found in almost any manual-training shop. If the shop is equipped with a power saw the stock may be worked up from this scrap material with very little trouble.

The joints are simple butt joints held in place by brads or finish nails of a suitable size. The nails should be countersunk and the holes filled with putty.

In finishing, apply two coats of flat white followed by two coats of enamel. At least twenty-four hours should be allowed between each coat for the paint to dry.

The bed shown in the accompanying drawing was designed for a large doll but it may be made proportionately smaller for other size dolls.

Bill of Material

2 pc.	1 x1 x15¾	Posts at Head
2 pc.	1 x1 x13⅛	Posts at Foot
4 pc.	1 x1 x15	Top and Bottom Rails
9 pc.	⅜ x ⅜ x 8	Spindles at Head
9 pc.	⅜ x ⅜ x 5⅜	Spindles at Foot
4 pc.	¼ x ⅜ x15	Spindle Frame Strips
2 pc.	⅜ x2½ x28	Side Rails
2 pc.	¼ x ½ x26	Slat Supports
4 pc.	¼ x ¾ x 2¼	Cleats
6 pc.	¼ x2 x16	Slats
4 R. H. Stove Bolts,		3/16 x1¾
4 Wing Nuts, for bolts		
4 Washers for bolts		

FINISHING CHRISTMAS BOXES WITH METAL OR GOLD LEAF

C. A. Kunou, Supervisor Manual Education, Los Angeles, Calif.

Decorative Materials. Embossed tapestry paper or pictures to obtain decorative effect on top of lids.

Analysis of Processes

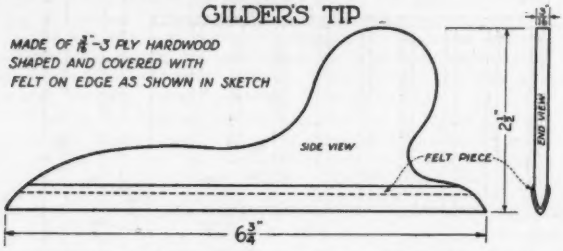
1. Apply coat of glue size over the box and let dry.
2. Apply coat of whiting and stipple, except the picture space on top of lid. Let dry and sand.

Note: A second coat of stipple should be applied if a higher class of finish is desired.

3. Cut the embossed tapestry paper to the required size and glue it on the top of lid, pressing it down thoroughly with a pad of clean soft rags. Let dry.

4. Apply two coats of orange shellac all over the box including the piece of tapestry paper, and allow to dry. Cut the shellac, 4 parts of alcohol to 1 part of shellac.

5. Apply coat of metal-leaf oil. This should be cut to 5 parts of turpentine to 1 part of oil, adding to it 3 drops of japan dryer. Let box stand a few minutes.



HOME-MADE GILDER'S TIP, C. A. KUNOU, LOS ANGELES, CALIF.

6. Soak a pad of cheesecloth in the oil solution and wring it out well. Then go over the entire box, wiping off as much oil as you can. Let stand over night to obtain the right tack.

Note: If the metal-leaf oil is not wiped off the surface in this way, it remains thick and rubberlike, and the metal leaf will flake off with it. The right idea is to obtain a thin hard tack to the surface and this is done by reducing it through the process of wiping.

7. Attach metal leaf by using a homemade wooden "tip" to spread the leaf on the surface and over the edges and corners of the box. See description of how to use the gilder's tip and illustrations.

8. Using a soft cheesecloth pad, pounce the leaf down carefully in the crevices of the embossed tapestry and in the recesses of the stippled surface. Then wipe off the leaf and in so doing press down quite hard with the pad which has been dipped into the leaf scraps so that no bare points remain on the gilded surface.

9. Spray or brush on a coat of transparent lacquer, and allow it to dry.

10. Apply various colors to the decorative points on the lid. Let dry at least 24 hours. Then prepare glaze using oil colors dissolved in benzine and glaze over the decorative colors and the box; wipe off the high lights and let dry.

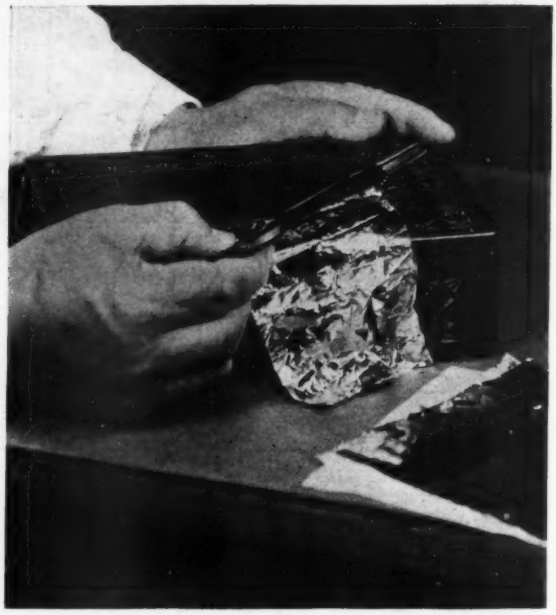
11. Spray or brush transparent lacquer all over the box to affix the decorative colors and the glaze.

When pictures are used as materials to decorate the top of lids, white shellac is used instead of orange shellac to cover both box and picture. This is done because orange shellac would discolor the picture.

How to Use the Gilder's Wooden Tip

The gilder's hair tip is used to attach gold leaf which is very thin and sensitive. Metal leaf is considerable heavier and stronger and the wooden tip is an excellent implement to attach such leaf to objects with flat and accessible surfaces. The illustrations show the method of handling the leaf with the tip.

To take the leaf from the book put the edge of the tip about 1½ in. from the end of the leaf and blow a "puff of wind" with "your mouth" so that the end of the leaf is raised up over the edge and against the surface of the tip. Now lift the leaf with the tip over the surface of the box and pass the tip over the leaf until it is stretched out on the tack. Then stroke lightly forward and backward with the tip, spreading the leaf well before pouncing it down with cheesecloth pad as described in the foregoing.

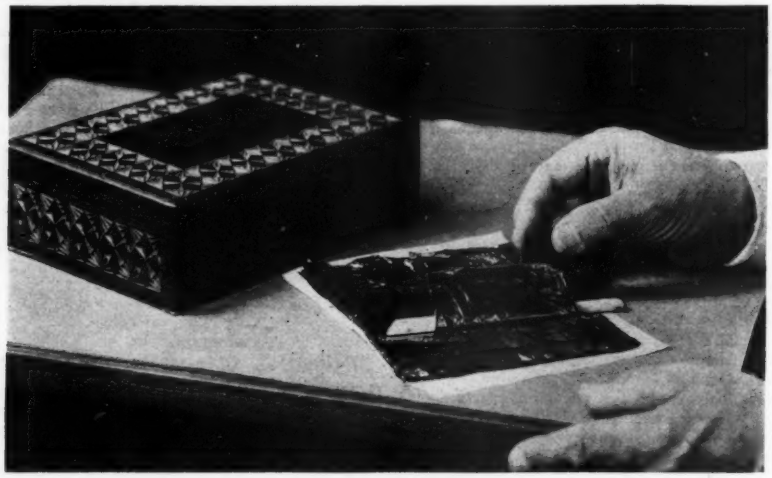


CONVEYING THE LEAF WITH THE TIP TO THE ARTICLE TO BE FINISHED, IS THE SECOND STEP IN THE PROCESS OF ATTACHING METAL LEAF. C. A. KUNOU, LOS ANGELES, CALIF.

Bronzed Linings

Liquid for coating the inside of boxes in which candy, fruits, and food products are packed.

Bronze powder, 2 teaspoonfuls to the pint.
Alcohol, enough to distemper.
Vanillin, 1 or 2 pinches.
Orange shellac, cut 1 part alcohol to 1 part shellac.
Mix bronze powder in the alcohol to a creamy consistency.
Put in vanillin powder and stir the mixture.
Intermix the two mixtures and stir well. Then spray or brush on the inside of box.



A PUFF OF BREATH LIFTS THE METAL LEAF OVER THE WOODEN TIP. THIS IS THE FIRST STEP IN THE PROCESS OF ATTACHING METAL LEAF. C. A. KUNOU, LOS ANGELES, CALIF.

This liquid, when applied inside, will not transmit odor or bad taste to the products packed in the box as varnish, oil, or lacquer liquids do.

If the boxes are not to contain fruits or candies, they may be lined with silk, plush, or paper. Or they may be simply shellacked or enameled.

A BROWNIE SEESAW

Margaret Fullerton

For rather small people, a seesaw which rocks because it rests on a circular rocker is sometimes to be preferred to one which is placed over a sawhorse. Especially is this true where it is to be used on a porch or in an indoor playroom. The reason why this one rocks so easily is because the brownie spends all his time pushing it forward with his hands and then rocking it back with his feet. When you tip him back and forth you can see that he works something like a squirrel in a round cage. There really are two brownies, one pushing

THE THIRD STEP IN THE PROCESS OF ATTACHING METAL LEAF, IS TO PRESS IT DOWN ON THE TACKY SURFACE WHICH IS TO BE FINISHED. C. A. KUNOU, LOS ANGELES, CALIF.

with his feet while the other is rocking back with his hands, because there is a rocker on either side of the teeter board.

Figure 1, shows the construction and dimensions of the seesaw. This size is for a very small child. If intended for larger children, these dimensions may be increased.

The problem is finished by painting with either paint or enamel. Having applied, dried, and sanded one or two priming coats, add the background color and allow it to dry before adding the decoration.

Being a stencil pattern, the design shown in Figure 2, may be used numerous times, once the stencil is cut. If stencil paper is not at hand, cardboard or oak tagboard will serve as a very satisfactory substitute. Cut the design and give the paper a coat of shellac to stiffen it and make hard clean edges.

Although there is only one color which brownies are supposed to be, it is possible that a gay young chap like this one might sometimes like to appear in some brighter hues. If he wears brown clothes, he will harmonize with a background of cream, yellow, tan, or blue. A yellow suit would be appropriate with a background of brown, lavendar, or black. He would look especially cheerful in a red costume against a cream-colored base. The border around the rocker and the edges of the teeter board are to be painted the same color as the rest of the decoration.

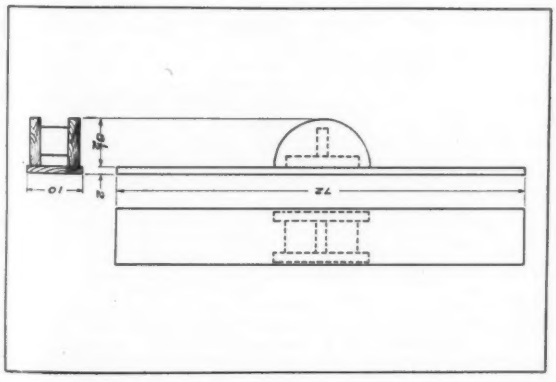


FIG. 1. BROWNIE SEESAW, DESIGNED BY MARGARET FULLERTON.

WHY BUY CHRISTMAS SEALS?

Because each seal you buy is:

1. A direct aid to your own health and the health of your family.

2. A financial assistance in the work of stamping out tuberculosis.

3. An indication that you are public-spirited.

4. A part payment of your share of the health-insurance premium of the nation.

5. An earnest to greater national growth.

Buy your *Christmas Seals* today.

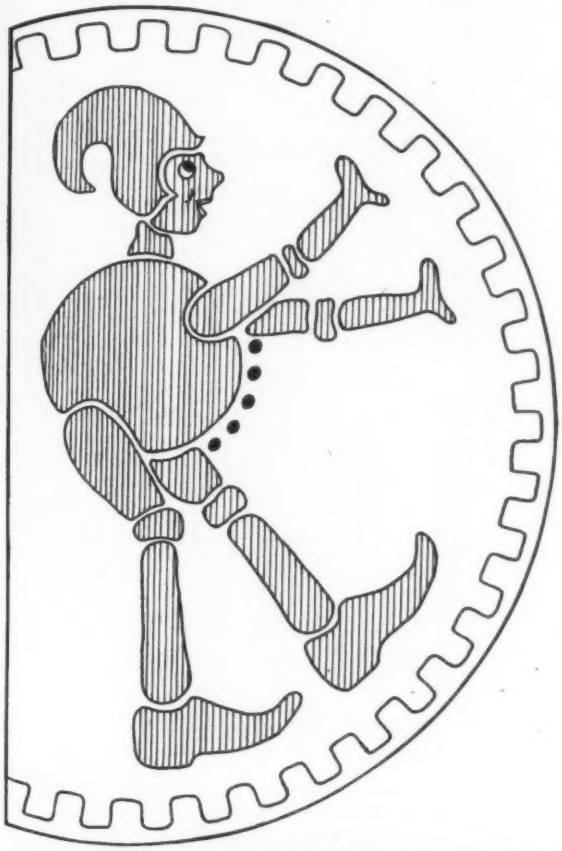


FIG. 2. BROWNIE SEESAW, DESIGNED BY MARGARET FULLERTON

THE QUEEN ANNE PERIOD STYLE TYPE OF LEG

Anton Anderson and Allan H. Nicol, Buffalo, N. Y.

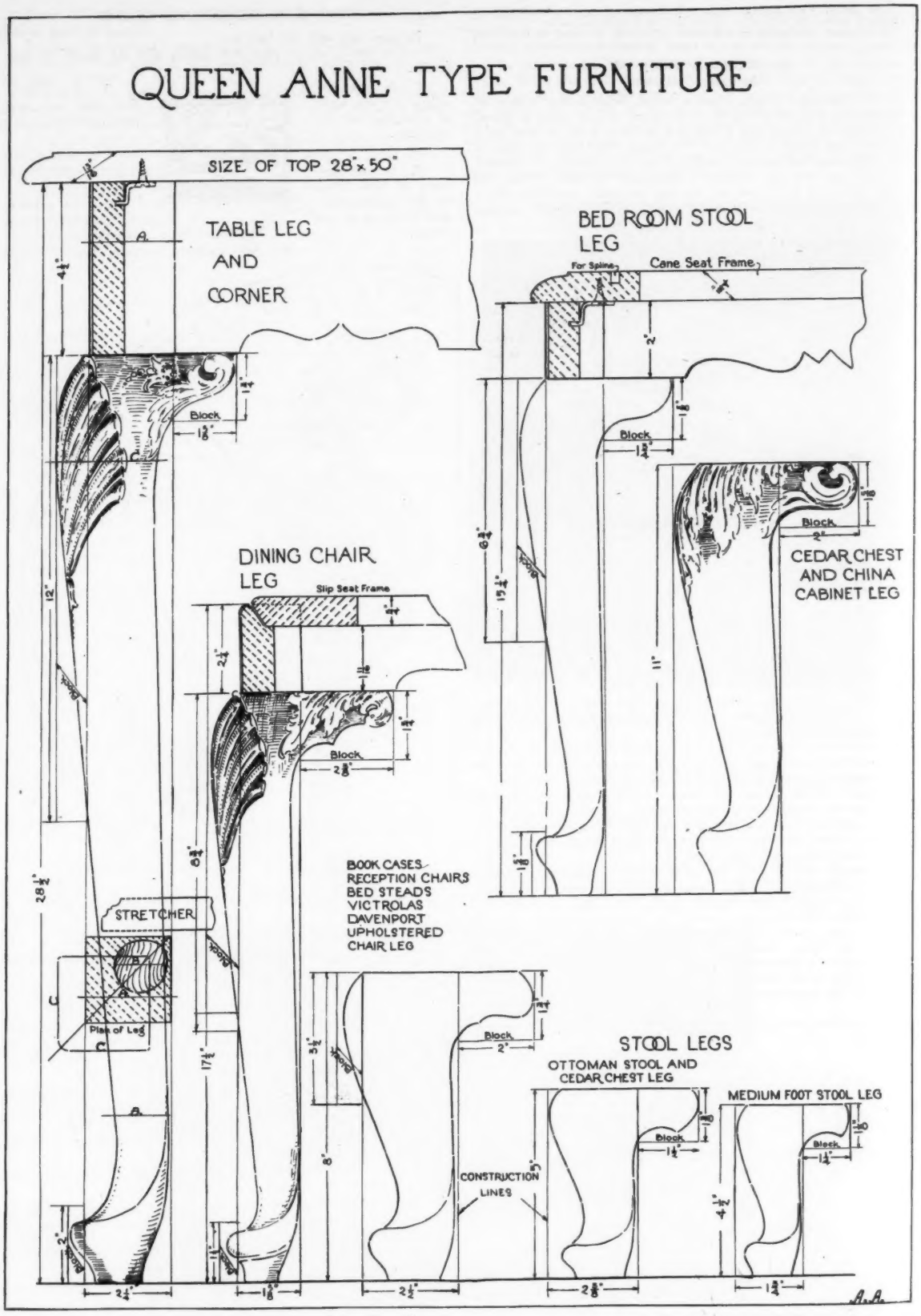
In the December, 1926, issue of the INDUSTRIAL-ARTS MAGAZINE appeared a treatise on The William and Mary Period Type of Leg. It is fitting that a similar article, treating the period style so closely allied in historical significance and value, also should appear.

The reign of Queen Anne, which followed very closely upon the reign of William and Mary, was crowded with noteworthy historical events in addition to the interest evidenced in the development of a type of furniture which was to vie with the creations of later-day furniture artists and master craftsmen.

A bit of interesting history concerning these two queens, and especially Queen Anne, would not be amiss here.

Many of the lovers of the good and the beautiful in furniture creations do not know that the one who was responsible for an everlasting design in furniture was also responsible, in a large measure, for the shaping of the early colonial history of the United States of America.

Queen Anne's reign in England covered a period from the year 1702 to the year 1714. In 1708 she appointed Lord Lovelace governor of New York and New Jersey. This was a very critical period of her reign as the English were waging a terrific war against the continent. This war was known as Queen Anne's war.



TYPICAL FORMS AND APPLICATIONS OF QUEEN ANNE PERIOD STYLE TO FURNITURE LEGS, ANTON ANDERSON AND ALLAN H. NICOL.

The brief administration of Lord Lovelace was distinguished by two notable circumstances. Bancroft, the historian, saw in this period the beginning of the great legislative battle which resulted in our national independence; and to this administration is also to be traced the beginning of German emigration to America.

According to F. A. Godcharles in "Today's Story in New York History," soon after Lord Lovelace was appointed governor, there was laid before Queen Anne a petition from one Rev. Joshua Kocherthol, asking that he and thirteen other persons of the Lutheran faith, from the provinces of the Palatinate and the Holstein, might be sent to America at the expense of the English government. As soon as Queen Anne ascertained that these German emigrants were in need, and worthy, she granted their wish. The first allotment consisted of

CHAIR FROM THE EARLIER DAYS OF QUEEN ANNE'S REIGN, ANTON ANDERSON AND ALLAN H. NICOL.

fifty-five instead of fourteen as was originally planned. They were distributed among the colonial families. Besides the minister, there were eleven farm laborers, some wine dressers, one stocking-maker, one blacksmith, one carpenter, and one clerk.

Thus, in extreme poverty and feebleness, with distress and suffering, began that mighty flow of German emigration which attained such enormous proportions.

In spite of the fact that the external relations between her country and the continental countries were anything but pleasant, this queen, of sturdy Dutch descent, found time to interest herself in those things which were to lighten the burdens of the housewives and beautify the homes of the middle and lower classes of the English folk. She proved to be just as democratic as her sister Queen Mary. Through her untiring efforts the social status of the English woman was raised to a much higher level.

The creations of the English and French furniture designers during her reign differed materially from those developed during William and Mary's time. The straight turned work of the former period was replaced with that having band-sawed sweeps.

The distinguishing features of this new design were most conspicuous in the chairs. Some of these were:

a) The plain splat and the broad-shouldered, hooped back.
b) The cabriole legs with the club, spoon, and carved claw feet.
c) Ornamentation of the shell with pendants, Dutch marquetry, and the eagle's head type.
d) Absence of the staunch underframing so strongly featured in the William and Mary type.

Another feature worth mentioning is that the chairs of the early part of that period always had turned stretchers or a band-sawed underframing. Later, the elimination of these resulted in a much more refined appearing piece of furniture. The accompanying sketches show pieces of both the early and later date embodying the features mentioned.

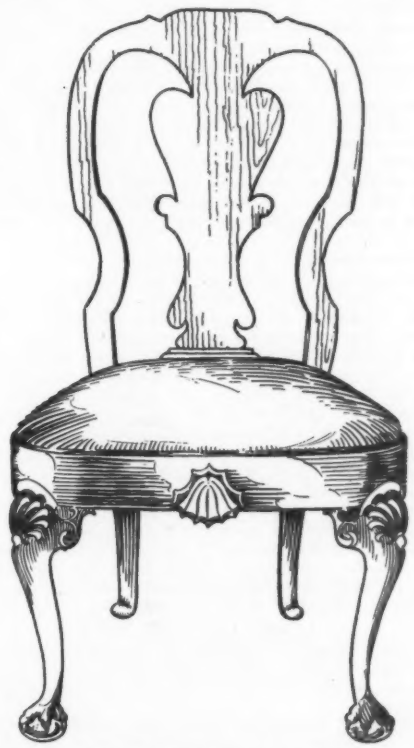
That the differences in the designs are more conspicuous in the chairs than in any of the other pieces, is accounted for by the fact that up to the Renaissance, articles used for seating were nothing more than mere benches. Then came a catering to the ladies of the royalty. A great effort ensued to harmonize the means of seating with their mode of dress, the elaborate tapestries, and the grandeur of the prevalent social functions. The broad seat was embodied in the Queen Anne chair to accommodate the full sweeping dresses worn by the ladies.

The introduction of the use of mahogany into the making of furniture seemed to have had a very favorable effect upon the executed designs. They were much more delicate and beautiful. The elimination of the widely used marquetry also is attributed to the more extensive use of this beautiful wood.

The first detailed drawing on the plate is that of the corner of a table. This gives the complete development in every detail. It shows the shell-carved leg and spoon foot. It gives all the dimensions essential to the blocking in preparation for the application of band-sawed pattern of the shape of the leg. The plan of the leg showing three distinct sections named and marked in such a way as to be readily understandable, will prove an aid to those developing this detail. The carving may be omitted without impairing the beauty or stability of the leg.

For the benefit of those who are not familiar with the proper procedure in blocking a Queen Anne type leg a brief résumé is given here.

1. Select and cut main pieces for legs to the desired length, width, and thickness. These should be perfectly square and not sanded.
2. Blocks of the dimensions specified are next procured and glued in place, one at the upper end and the other at the lower end. These blocks should be $\frac{1}{8}$ in. wider than thickness of main part so that when they are applied they will extend $\frac{1}{16}$ in. on each side for redressing.
3. After the glue has set thoroughly, the sides of these blocks are carefully dressed even with the main piece and the second set is glued in place. This second set of blocks overlaps the first set glued on so as to form a complete corner.
4. The pattern, made of ¼-in. veneer band-sawed to desired shape, is



EARLY DRAGON-CLAW CHAIR, DATE ABOUT 1710, ANTON ANDERSON AND ALLAN H. NICOL.

applied to the flat sides of the legs.
5. After the band-sawing, the leg is shaped with the aid of a spokeshave and wood rasp to the plan shown in A, B, and C. The lower part of the leg or the spoon foot should be formed somewhat like the shape of a spoon.

The second drawing is that of a chair showing the slip-seat type of construction. The procedure in this case is similar to that used in the case of the table leg. It may be carved or allowed to remain plain. In blocking a chair leg, blocks should not be more than $\frac{1}{16}$ in. thick at the top and not more than ½ in. on the bottom.

The next drawing portrays the corner of a bedroom stool complete. The cane-seat type of construction is used.

A cedar chest or a china-cabinet leg of proper proportions, and sturdy of form, comes next.

The three legs at the bottom are for various purposes. Each was designed to fill a long-felt want and proportioned to the purpose it is to serve. The largest may be used for bookcases, reception chairs, bedsteads, victrolas, davenports, and upholstered chairs. The next in size is used for ottoman stools and cedar chests. The smallest is used for medium-sized stools which find a warm welcome in almost any room of the modern home.

The Queen Anne period style of leg is by no means an easy piece to execute. It requires much patience. But any youth of high-school age with an average skill can succeed with it, if he is persistent. Once completed, he has something lasting in beauty and strength, something of which he may be justly proud.

PRESIDENT LEE'S MONTHLY A. V. A. LETTER

This letter is being written on the "Gold Coast Limited" en route to the middle west. The occasion of my journey lies in the fact that I am scheduled to speak at least twice at each of three annual meetings of great state teachers' associations, those of Iowa, Missouri, and Wisconsin. Most of my colleagues on the executive committee of the American Vocational Association are performing similar service during these autumn months. The significance of these appearances on state programs increases when it is realized that all of us are spreading the message of vocational education wherever we go. We have been called to spread this message by those responsible for making up the programs, which means that the interest in vocational education was never so great among our educational leaders and the rank and file of our teaching force as it is today.

In each of these states I will find a state association affiliated with the American Vocational Association, and it will be my privilege to meet with all of them. There is a relation between the presence or absence of a state association and an interest on the part of the state in vocational education. The fact that members of the executive committee and other leaders in vocational education are asked to address state teachers' associations may be explained primarily by the interest and activity which state vocational associations are manifesting, and the power their united forces gives them when they ask for recognition on the general programs.

If a state vocational association did nothing else but bring discussions concerning the problem into the important general meetings of the state teachers' associations, it would be sufficient reason for existence. When there is added to this the *esprit de corps* which comes from united forces, the power of opinion which can be centered wherever it is needed, the research and publications which can be carried on locally and nationally by reason of the accumulation of small fees into large funds, the great importance of affiliated state associations in every state needs no argument beyond the presentation of facts.

California believes in its state association and expects to have fifteen hundred members represented at the meeting of the House of Delegates in Los Angeles. Pennsylvania publicly claims she will exceed the membership of any other state. Wisconsin, Ohio, and Indiana are saying nothing, but past performance indicates that they will all be fighting for top place. Interest is white-hot everywhere.

Coworkers, there never was a time when interest in the program for which we stand was at such a peak as it is now. We are challenged to state our objectives clearly, to outline our procedures, and to demonstrate that we are practical in application as well as in theory. In the meeting of these challenges, the American Vocational Association has its part to play, but the firing line must be faced by the New York Vocational Association, the Oklahoma Vocational Association, the Florida Vocational Association, the North Dakota Vocational Association, and the remaining 44 state associations. We are at the end of the first decade of vocational education under the Smith-Hughes Act. The second decade holds boundless possibilities if we will but seize the opportunities which await only our initiative. —*Edwin A. Lee, President American Vocational Association.*

LEWIS GUSTAFSON

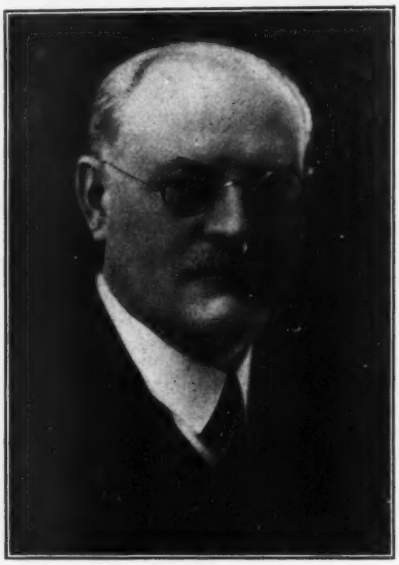
Mr. Lewis Gustafson, president of the Ranken School of Mechanical Trades, St. Louis, Missouri, whose death occurred on August 30 last, was connected with the Ranken School for the last twenty years.

Mr. Gustafson became the head of the institution in September, 1907, and the school was incorporated the following October. Previous to the opening of the building in September, 1909, Mr. Gustafson gave his entire time to the superintendence of the erection of the building. With the occupation of the building he turned his attention to the problems of organization and administration.

The problems confronting Mr. Gustafson were of the greatest importance. It was a question how a trade school would be regarded by the various trade unions and to what extent there might be opposition. He solved these problems with wisdom and smoothed out all objections. In the twenty years of his connection with the school by his tact, personality, and good judgment, all difficulties were overcome and the school commanded increasing respect and cooperation of all those engaged in the mechanical trades. Under Mr. Gustafson's administration, the Ranken School obtained a national reputation and is generally considered the leading educational institution of its kind.

Mr. Gustafson was an executive of the highest ability and his work was admirable. He loved the school and gave to it a most faithful and efficient service. He loved boys and was especially thoughtful of the boy who was handicapped, either physically or mentally.

To the employees of the school, Mr. Gustafson was more than an employer and a superintendent. He was a friend and counselor. The relation was more like father and son than employer and employee. It was largely due to the happy spirit of loyalty and cooperation that the work of the school was so successfully carried out.



LEWIS GUSTAFSON.

Mr. Gustafson through his work at the Ranken School became nationally known as an educator and the school during his incumbency grew from 241 students in 1909 to 1,622 in 1926.

He was born at Aurora, Ill., in 1874, and was a graduate of the University of Chicago. He received his master's degree from Washington University.

Memorial services were held at the Ranken School with a large number of the students in attendance. Mr. F. H. Bacon, a trustee of the school, and Mr. C. H. Turner, acting superintendent, were the speakers.

MR. MANUEL AGUAYO VELEZ

General Superintendent of Manual Arts, San Juan, Porto Rico.

Announcement has been made of the appointment of Mr. Manuel Aguayo Velez as general superintendent of manual arts in Porto Rico. Mr. Velez is well fitted for the position to which he has been appointed and it is expected that under his expert direction the work will reach a high state of perfection.

MR. WOOD BECOMES SECRETARY-TREASURER

Mr. Harry E. Wood of Indianapolis, Ind., recently has been appointed secretary-treasurer of the Western Arts Association to succeed Raymond Fell, resigned. Mr. Wood will have his headquarters in Indianapolis, where his address will be 5215 College Avenue.

Mr. Wood received his education in the schools of Indianapolis, while his professional training was received at the School of Industrial Arts, Philadelphia, at Cornell University, Indiana University, the United Typothetae School of Printing, and Purdue University. He has had considerable experience as a teacher of woodworking, art metal work and printing, and since 1922 has been director of vocational education and manual training at Indianapolis.

MR. HARRY E. WOOD,
Secretary-Treasurer, Western Arts Association, Indianapolis, Ind.

Mr. Wood is a frequent contributor to educational periodicals devoted to industrial-arts work and is the author of a book on mechanical drawing. He has been connected with the Western Arts Association since 1905 and has acted on a number of committees of the association. He was treasurer of the association in 1909, auditor in 1917, and later president. As a member of the council, he was active for six years and served as chairman in 1925.

PROFESSOR WALTER SARGENT DIES

Prof. Walter Sargent, whose sudden death occurred at his summer home in North Scituate, Mass., was the head of the art department at the University of Chicago. Prof. Sargent's death ended a long service to the university from 1909 to 1927. He became chairman of the art department in 1925 and through his work growth and success have been assured.

Professor Sargent was a very effective teacher, who attracted a surprising number of young men and women to the study of art and left an indelible impress on them. He was the author of Art Education in the United States and he held the honorary degree of doctor of arts given by Brown University. He had completed well-based plans for a new art building and the development of a school of fine and industrial arts.

NEW BOOKS

Reconstruction of Industrial Arts Courses

By David Snedden and William E. Warner and others. Cloth, 143 pages. Published by Bureau of Publications, Teachers College, Columbia University, New York.

This book is the outcome of an analytical study made by a group of industrial-arts teachers relative to the objectives and reconstruction of industrial-arts courses in junior high schools. The material for the book was submitted in 1922, but it was not published until 1927.

One chapter is devoted to a history of industrial arts in America. Other chapters are devoted to a very thorough analytical study of the why and the what of industrial arts in the junior high school. The value of industrial arts to different types of learners as well as lists of proposed projects, and illustrative case-situations make up the balance of the book.

A Printers' Manual of Style

Compiled by Frederick W. Hamilton. Cloth, 130 pages. Published by the Committee on Education, United Typothetae of America, Chicago, Ill.

This book is a handy, well-arranged style manual intended for the apprentice printer. It is simple and direct and ought to find a place in every printing office.

In spite of the smallness of the book, its chapters on spelling, capitalization, compound words, division of words, spacing, indention, abbreviations, italics, and punctuation, are quite thorough and comprehensive.

Industrial- (Manual) Arts Test for Junior and Senior High School

By Harry B. Nash, M.A., and Roy R. Van Duzee, B.S. Paper. Price for a set consisting of 25 tests, 1 manual of directions, 1 key sheet, and 1 class record, $1.25. Specimen set consisting of 1 test, 1 manual of directions, 1 key sheet, and 1 class record, 25 cents. Published by The Bruce Publishing Company, Milwaukee, Wisconsin.

The authors of this test have succeeded in preparing a very comprehensive test which should find a warm welcome from all industrial-arts teachers in junior and senior high schools. The test consists of 60 true and false statements, 42 incomplete statements, 9 diagrams of common joints, and an incomplete drawing of a simple wood block. The manual of directions gives complete information as to the purpose of the test, directions for administering, scoring, recording scores, and interpretation of scores. The correct answers on the test sheet are arranged in such a manner that the checking of scores is very much facilitated. The class record furnishes a complete summary of the results of test for every member of the class.

Introduction to Organic Chemistry

By Roger J. Williams. Cloth, 567 pages. Price, $3.50. Published by D. Van Nostrand Company, New York City.

This book attempts to simplify the subject of organic chemistry, by placing special emphasis on the relationships which exist between the constituent elements in the simpler compounds so that the student gradually learns how to predict the reactions that take place. Enough inorganic and theoretical chemistry has been injected to show the connection between the various branches of the science of chemistry. Numerous tables are interspersed throughout the book. A number of problems have been appended at the end of each chapter.

Nature Study and Science for Intermediate Grades

By Gilbert H. Trafton. Cloth, 367 pages. Published by The Macmillan Company, New York.

This attractive textbook is designed for the pupils of the fourth, fifth, and sixth grades. It lays the foundation for the science study taken up in the junior high school.

The book is divided into three divisions: Autumn, winter, and spring studies. Every means is made use of to vitalize the study and to arouse the interest of the pupils.

THE INDUSTRIAL-ARTS ROUND TABLE OF CHICAGO

R. B. Bagby

The first meeting of the Industrial-Arts Round Table for 1927-28 was held at the Y. M. C. A. building on Friday, Oct. 28, 1927. About 70 men attended.

The subject of the discussion was "How Can We Sell the Industrial-Arts Course to the Community?"

The main speaker, Mr. D. W. Castle of the Joliet Township High School, said that it was the school's task to interpret the industrial-arts program for the business man as well as for the parents of the boys who attend school. The things that the boy makes in these classes, the fact that he learns things which make it easier for him to get and hold a job, the circumstance that the school is training a supply of much-needed semiskilled workers for the labor market, all these items must be emphasized and brought before the public. The money spent for industrial-arts work must be interpreted in terms of the service which it renders.

Mr. L. Day Perry warned against slip-shod methods in the school and urged the industrial-arts teacher to keep the objectives of this educational movement ever in mind.

Mr. N. F. Fultz of the J. Sterling Morton High School, pointed out that if the interest and attention factors inherent in industrial-arts work were rightly used, there would be little difficulty in selling the work to the student.

Mr. J. I. Lockhart of Waukegan urged that an earnest endeavor be made to give industrial-arts education the publicity which it deserves and needs.

Mr. Schneider of Deerfield related that the houses which he built with his students really sold his courses to his community.

Mr. Wahlstrom emphasized the fact that in order to sell an article, it must be shown. Not only must the industrial-arts teacher invite the parents and the public, but he must sell his department to the rest of the faculty.

Mr. Bell urged that efforts be made to interest the chamber of commerce in the school. He said, "Sell the school to the community through the influential members of the community."

Mr. Heman J. Barber with his slides on school activities showed one way in which child, parent, and employer can be interested and convinced of the immense value which the industrial arts have to offer.

NOW, ARE THERE ANY QUESTIONS?

741. Q.: Do you have any plans or books on building playground equipment? If you do I would be glad to receive some information in regard to same.—*G. W. M.*

Articles on playground equipment may be found in the INDUSTRIAL-ARTS MAGAZINE under the following dates:

Nov., 1916, p. 500; Jan., 1918, p. 11; May, 1918, p. 182; Aug., 1918, p. 320; Sept., 1926, p. 321.

743. Q.: I wish to perfect a plan whereby I can rotate the shop routine among the students; such as tool clerk, cleaning machines, care of the lumber room, passing out stock, etc. Can you give me any information on this?—*W. C. R.*

There are articles on the care of tools and equipment, etc., on page 12 of the January, 1920, issue of the INDUSTRIAL-ARTS MAGAZINE; also on page 286, July, 1922; page 73, February, 1925; page 195; May, 1925, and on page 349, September, 1925.

There are various methods of taking care of the rotation of jobs such as machine cleaning, care of lumber room, etc., all of which have their advantages and disadvantages. One method was worked out by a teacher in such a way that these jobs were part of the course. In other words, every pupil going through his classes had to be foreman for one day before his course was finished. The same was true of the tool-checking position. This idea possibly could be worked out in your shop.

Another teacher used the following method: He carefully analyzed the different jobs such as those which you mention. He stated very carefully what duties were involved in each one of the jobs. Then he had each one of his classes vote on a foreman and one of the duties of this foreman was to assign boys to the various jobs. In order that the rotation would involve all students and not make any of the cleaning jobs a burden on any one of the individuals, he required each foreman to make a table with as many horizontal columns as there were extra jobs. Then all the names of the students of the class were written down on this table and the jobs assigned to the various boys for the entire semester. This showed graphically just who was to take care of any particular job on a given day, and also avoided giving the same job to the same boy oftener than it was given to any other student.

Another teacher made use of this same method, but took care of the distribution of the jobs himself. He did not have very much faith in the foremanship system. Teachers who have used the foremanship system, however, claim that the work is usually as well done if they have a foreman to check the cleaning jobs as if they did it themselves.

742. Q.: Is there any issue of your magazine which shows how to make a practical workbench with compartments for holding the necessary tools?—*H. C. T.*

You will find information on the making of practical workbenches on page 30 of the January, 1916, INDUSTRIAL-ARTS MAGAZINE, also on page 376 of the October, 1918, issue, and on page 34 of the January, 1926, issue.

740. Q.: Can you tell me where I can get information on the history of glue, sandpaper, paint brushes; also something on their manufacture and material used? I want to use this material in talks to my students in woodworking and finishing.—*H. B. R.*

General Information

"Young Folks' Encyclopedia of Common Things." Champlin. $3. Henry Holt & Co., New York. (Sandpaper, varnish.)

"New International Encyclopedia." Gilman, Peck, and Colby. Published by Dodd, Mead & Co., New York. (Sandpaper and shellac.)

"Scientific American Encyclopedia." Hopkins, Munn & Co., New York. (Glue, varnish, wax, stains.)

"How It is Made Series." Archibald Williams. Price, $1.25. Published by Thomas Nelson & Sons, New York.

"Industrial Studies of the United States." Nellie B. Allen. Price, 65 cents. Published by Ginn & Co., Boston, Mass. (Glue and turpentine.)

Manufacturing Processes

"Glue and Gelatine." Alexander. Price, $3. American Chemical Co., New York.

"Manufacture of Varnishes and Kindred Industries." McIntosh. $3.50. D. Van Nostrand Co., New York.

"Analysis of Paint and Varnish Products." Hooley. Price, $3. John Wiley & Sons, New York.

"Paint Making and Color Grinding." Ubele. $10.50. Painters' Magazine, New York, N. Y.

"Technology of Paint and Varnish." A. H. Sabin. John Wiley & Sons, New York.

"Painters' Colors, Oils and Varnishes." G. H. Hurst. $3.50. J. B. Lippincott Co., Philadelphia, Pa.

"How to Mix Paints." Godfrey. 50 cents. David McKay. Philadelphia, Pa.

"Students' Handbook of Paints, Colors, Oils, and Varnishes." Purnell. $1. Geo. E. Watson & Co., Chicago, Ill.

"Principles and Practice of Upkeep Painting." $2. E. I. duPont de Nemours & Co., 35th and Gray's Ferry Road, Philadelphia, Pa.

"Modern Glues and Glue Handling." G. H. Teesdale. Periodical Publishing Co., Grand Rapids, Mich.

"Glue Handling." F. Kahrs. Price, $1. Published by the author at East Haddam, Conn.

745. Q.: I wish to build a cutaway-stern motor boat for use on the Snake River—one in which I can place a Ford engine. If you could send any material that would be helpful to me, I would appreciate it very much.—*M. H.*

A.: The following books on motor boats might be of help to you:

"Hand-V Motor Boat Designs." Hand. New Bedford, Mass.

"Book of the Motor Boat." A. H. Verrill. $1. D. Appleton Co., New York.

"Gas Engines and Launches." Grain. $1.25. Munn & Co., New York.

"Design and Construction of Power Boats." Johnson. $3. Penton Publishing Co., Cleveland, Ohio.

"Motor Boats and Boat Motors." Page and Leich. $4. N. W. Henley Co., New York.

"Marine Motor." Sterling. 70 cents. Outing Publishing Co., New York.

A PERSONAL LETTER OF INVITATION

The editors of the INDUSTRIAL-ARTS MAGAZINE have requested me to write a personal letter to the Magazine's readers, inviting them to the Los Angeles convention of the American Vocational Association, December 17, 19, and 20. It is a most unusual pleasure to accede to their request.

There are many reasons why I extend the invitation gladly. In the first place I am inviting you to come to my homeland, the great West. Never before have we westerners been able to entertain our eastern friends. We do not expect to have the chance again in many years. Accordingly we are leaving nothing undone, which may contribute to your comfort and pleasure. Just one example, quoted from a recent letter from the chairman of the banquet committee, an assistant superintendent of schools of Los Angeles: "During the banquet a beautiful pageant of California in music and color will be presented. It will represent various episodes in California history and will be a most exquisite spectacle."

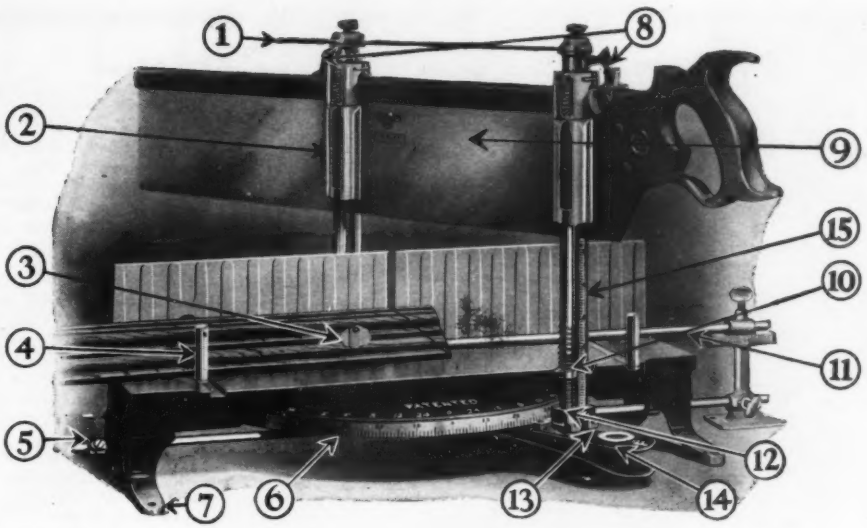
We are proud, too, of the progress we have made in vocational education, and we want you to see it and tell us how we can make it better.

I invite you with enthusiasm because of the program of the convention itself. Those in charge of the various parts of the program have done admirably. The only unfortunate aspect will be that in choosing to attend one session you will of necessity eliminate another session of equal attractiveness. The program will set a high standard for future conventions.

But most of all I invite you because you will, when you return home, have an entirely new conception of the term American. I am writing this on board a transcontinental train en route to Milwaukee. I have taken the trip upwards all of thirty times, and yet there is always the thrill of a new consciousness of what it means to be an American citizen. Mile after mile, station after station, state after state—all speaking the same language, using the same currency, possessed in the main of the same ideals, all one people. We call ourselves the American Vocational Association. I invite you to learn anew the real meaning of America.

A last word: Give yourself time; come early and stay late. There is much to see and California at Christmas time is lovely. You will find the whole state eager to welcome you.

EDWIN A. LEE,
President, American Vocational Association.



Do you know these features of the Stanley Mitre Box?

Stanley Mitre Boxes have several special features and many fine adjustments to insure accuracy. Features not on other tools of the same type. Here is a list of the fifteen superior points of the Stanley Mitre Box No. 246:—

1. Tie Bar holds uprights rigid.
2. Maximum amount of guidance for saw in all positions.
3. Adjustable spurs in back keep work from slipping.
4. Stock guides hold odd shapes and pieces tightly against the back.
5. Pointed Screws level the box and stop it from sliding.
6. Graduated quadrant is numbered for sawing 3-, 4-, 5-, 6-, 8-, 12-, and 24-sided figures. Swivel clamps rigidly in any position.
7. Detachable legs.
8. Automatic catches hold saw above work and release it when a trip engages the front catch.
9. A first quality saw.
10. Graduated upright bars, front and rear, have movable stops. The opposite bars have positive stops operating on a square thread.
11. Length stop for duplicating pieces of any length.
12. Uprights can be turned to take up play of saw.
13. Uprights can be adjusted laterally to counteract improper sharpening of saw.
14. Two sockets permit the use of a long or short saw.
15. Can be made very compact for carrying by removing the uprights.

If you do not have a good Mitre Box in your shop, include a Stanley No. 246 in your next requisition.

The Stanley Catalog No. 34*g* should be in the hands of every Manual Arts or Vocational Supervisor or Instructor. It lists and shows pictures of over 1500 items, as well as detailed drawings of their construction and adjustment.

In addition, the appendix gives a number of tables covering subjects pertinent to woodworking.

You should have a copy of Catalog No. 34*g* by all means. Send for yours today.

THE STANLEY RULE AND LEVEL PLANT
Educational Department, New Britain, Conn.

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STANLEY TOOLS

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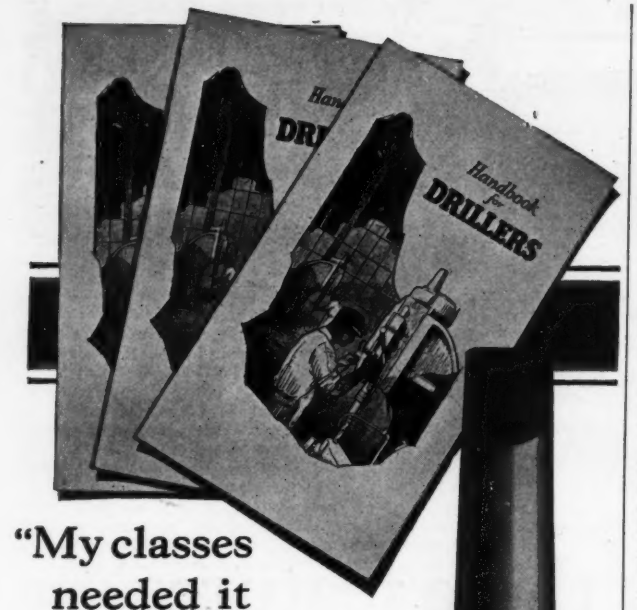


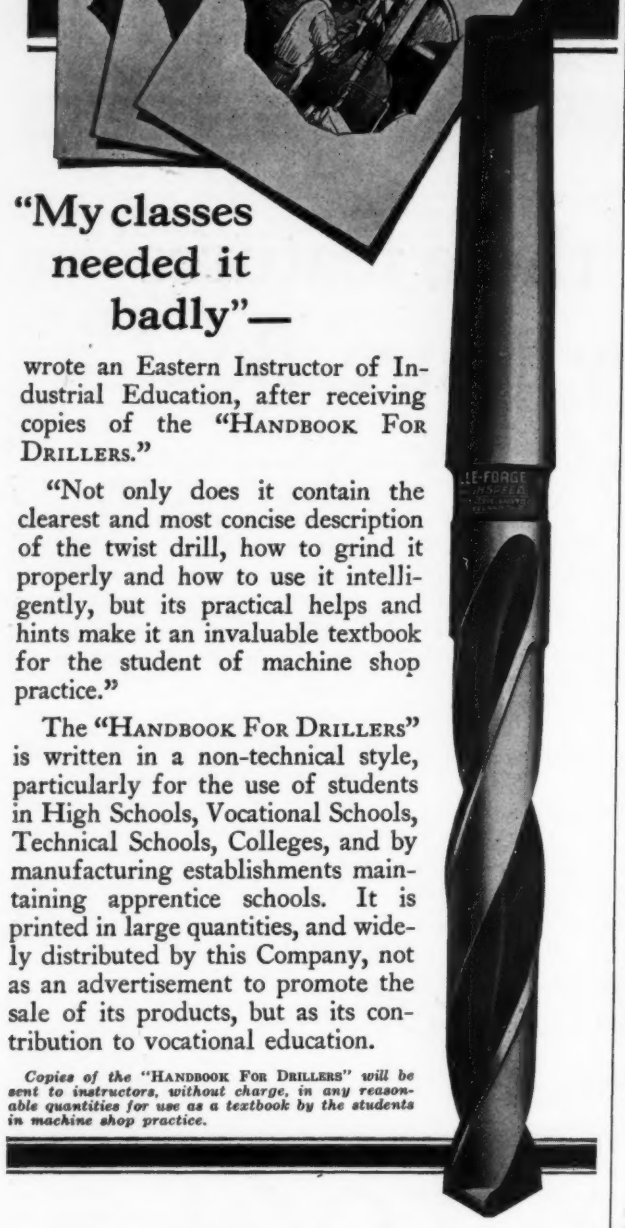
"My classes needed it badly"—

wrote an Eastern Instructor of Industrial Education, after receiving copies of the "HANDBOOK FOR DRILLERS."

"Not only does it contain the clearest and most concise description of the twist drill, how to grind it properly and how to use it intelligently, but its practical helps and hints make it an invaluable textbook for the student of machine shop practice."

The "HANDBOOK FOR DRILLERS" is written in a non-technical style, particularly for the use of students in High Schools, Vocational Schools, Technical Schools, Colleges, and by manufacturing establishments maintaining apprentice schools. It is printed in large quantities, and widely distributed by this Company, not as an advertisement to promote the sale of its products, but as its contribution to vocational education.

Copies of the "HANDBOOK FOR DRILLERS" will be sent to instructors, without charge, in any reasonable quantities for use as a textbook by the students in machine shop practice.



The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON

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THE A. V. A. CONVENTION PROGRAM IN BRIEF

Friday, Dec. 16, 1927

Arrival and registration of delegates.

Inspection trip through the schools of Los Angeles.

Saturday, Dec. 17, 1927

Morning Session: "Foreman Conferences."

Chairman: Frank Cushman, Chief, Industrial Education Service, Federal Board of Vocational Education. Other speakers are: State Director, F. J. Trinder, Conn.; Supt. W. E. Parker of the Emsco Derrick and Equipment Co., Los Angeles, Calif.; Federal Agent Mrs. Anna L. Burdick, Washington, D. C.; State Supervisor Geo. S. Sanders, Ariz.; Charles R. Allen, Educational Consultant, Washington, D. C.

"Vocational Teacher Training."

Speakers on the program are: State Director R. O. Small, Boston, Mass.; Asst. Supt. V. Kersey, Los Angeles, Calif.; State Director W. A. O'Leary, New Jersey; Chas. R. Allen, Washington, D. C.

Afternoon Session: "As the Superintendent Sees It."

Chairman: Edwin A. Lee, president of the A. V. A. Speakers on the program are: State Supt. William John Cooper; Supt. Susan M. Dorsey of Los Angeles, Calif.; Supt. A. H. Hughey of El Paso, Tex.; Supt. Joseph M. Gwynn of San Francisco, Calif.

Evening Session: Annual banquet at Los Angeles Biltmore Hotel: Toastmaster, Edwin A. Lee, president of the A. V. A. Speakers on the program are: A. W. Crawford, director of technical education, Canada; M. J. Bernard, director of vocational education, Mexico; James R. Coxen, director of vocational education, Hawaii; J. C. Wright, director of Federal Board for Vocational Education, United States.

Monday, Dec. 19, 1927

Morning Session: "The Day Vocational School—Its Problems and Relationships." Chairman, A. W. Crawford, director of technical education, Canada. Speakers on the program are: Prof. Ralph E. Pickett, New York University; Supt. L. W. Smith, Joliet, Ill.; Director L. B. Travers, Oakland, Calif.; Director A. Frigon, Quebec, Canada.

Afternoon Session: "Adult Education." Chairman, Edwin A. Lee, president of the A. V. A. Speakers on the program are: Leon A. Richardson, University of California; State Director George P. Hambrecht, Madison, Wis.; Director C. A. Prosser, Minneapolis, Minn.

Annual Business Meeting.

Tuesday, Dec. 20, 1927

Morning Session: "The Professional Education of the Vocational Teacher in Service."

Chairman: R. H. Rodgers, Chief of Division of Vocational Teacher Training and Research, Milwaukee, Wis. Speakers on the program are: Director O. H. Day, Kansas City, Mo.; Director R. L. Cooley, Milwaukee, Wis.; Miss Adelaide S. Baylor, Washington, D. C.; State Supervisor I. S. Novall, Salt Lake City, Utah.

The attention of those who are planning to attend the A. V. A. convention at Los Angeles, is called to the following:

Special Railroad Rates

Delegates from points east of and including Ogden; Salt Lake City, Utah; Albuquerque, New Mexico; and El Paso, Tex., should purchase All-Year Excursion tickets which are sold at fares approximately 10 per cent less than normal round-trip fares. This class of transportation does not force the purchaser to go and return by the same road. Another advantage is that these tickets are good for six, eight, or nine months.

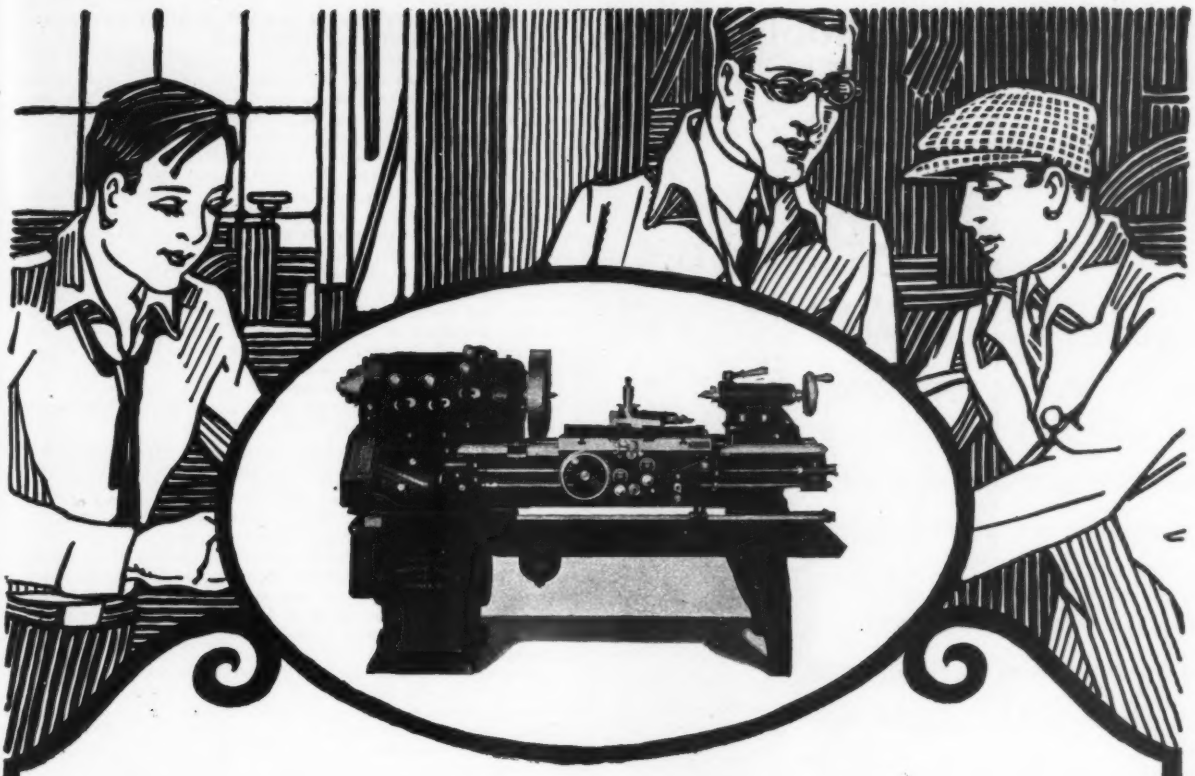
The Identification-Certificate plan will be in effect at points in California, Arizona, Nevada, Utah, New Mexico, and El Paso, Tex. Sale dates from California are December 11 to 21, with return limit of December 24; from Arizona and Nevada, December 10 to 20, with return limit December 25; from Utah, New Mexico, and El Paso, Tex., December 9 to 19, return limit December 26. Those taking advantage of the rates quoted in this paragraph must go and return by the same route and have their certificate validated at the registration booth where railroad officials will be available.

For further information, members are requested to apply to their local agent. Possibly delegates from the far east could arrange for a combination of the two plans.

AIMS OF MANUAL ARTS

K. G. Smith, State Supervisor of Industrial Education, Michigan

At the Manual-Arts Section meeting in Ironwood, Hans Schmidt, state supervisor of manual arts in Wisconsin, sounded a warning. A recent survey of his, asking teachers of manual arts to define their objectives, showed a vast difference of opinion as to what these objectives really are. He made it very plain that any subject which cannot be justified will eventually be dropped from the curriculum. To have so many diverse objectives for manual arts as his survey showed is to fail to have any. A subject without well-defined objectives stands in a precarious position.



Train Your Students for Their Jobs — Use MONARCH LATHES

Train your students on MONARCH LATHES and when they go from your school they will be ready for their jobs —valuable men immediately without the necessity of going through another period of training in the shop.

The student that is trained on a Monarch Lathe is trained in actual shop practice — for the Monarch is the first choice of Industrial America. Today more Monarch Lathes are being sold to industrial plants than any other lathe built.

The Monarch motor-driven, helical geared Lathe is the ideal equipment for instructional purposes. It is far in advance of other lathes in design. It is as near danger-proof as any lathe can be made. It is as noiseless as any lathe can be—an important advantage in the instruction room.

Monarch Lathes are used in the Massachusetts Institute of Technology, Yale, Cornell, and in hundreds of the best technical and high schools — proof that the Monarch is the practical lathe for modern school equipment.

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The Ratchet adds speed

Try This "YANKEE" Way of Driving Screws

You just turn to and fro . . . easy like . . . without letting go of handle. A slick ratchet movement drives screw home. Right and Left Ratchet, and Rigid. Saves time and strength.

Ask your dealer to show you the "Yankee" Ratchet Screw-driver.

No. 10—With ratchet shifter moving lengthwise with tool. Eight sizes: 2 to 12-inch blades.

No. 11—Same as No. 10, except shifter moves across tool.

No. 15—With "Yankee" Thumb-turn on blade for starting wobbly screws with thumb and forefinger. Six blade lengths, 2 to 8-inch. All blades, 5/16 diameter.

SOME OTHER "YANKEE" TOOLS

Plain Screw-drivers — Automatic Feed Bench Drills
Spiral Screw-drivers — Automatic Feed Chain Drills
Ratchet Tap Wrenches — Vises with Removable Base
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Dealers Everywhere Sell "Yankee" Tools

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Write for FREE "Yankee" Tool Book

This interesting little book is for all lovers of fine tools. It tells just what you want to know about all the famous "Yankee" Tools for making work easier and quicker.

North Bros. Mfg. Co., Philadelphia, U. S. A.

"YANKEE" TOOLS
Make Better Mechanics

WILL HOLD EIGHTEENTH MANUAL-ARTS CONFERENCE AT CHICAGO

The eighteenth manual-arts conference will be held December 1, 2, and 3, at the University of Chicago, Chicago, Ill. The headquarters for the meeting will be the Hotel Del Prado, and the meetings will be held in the assembly room of the hotel.

At the opening meeting on December 1, the topic for discussion will be "The Relation Between Vocational-Industrial Education and the Manual Arts," and "State Licensing Laws as They Apply to the Manual-Arts Teacher." In the afternoon the meeting will hold a discussion on "Individual Instruction Sheets," and in the evening there will be reports on the progress in the preparation of teachers of manual arts and industrial education.

On the second day the meeting will open with a discussion of "Practice Teaching," and "Practical Problems in Shop Planning, Machinery, and Equipment." At the afternoon meeting the meeting will hold a discussion on "The Significance of Manual Arts in the Junior-High-School Program." In the evening there will be a discussion on "Training Teachers in Service." Mr. Robert W. Selvidge of Columbia, Mo., will give a summary of the day's discussions.

On the third day, there will be a discussion of "Vocational Guidance and the Manual-Arts Teacher."

THE STOUT INSTITUTE PRINTING-TEACHERS' ASSOCIATION

During the summer session held at the Stout Institute, Menomonie, Wisconsin, the men who are teaching printing effected an organization known as The Stout Institute Printing-Teachers' Association. The Stout Institute being a pioneer in the field of industrial arts has graduated many printing teachers. A number of these teachers were back to school this past summer. It was felt by those in attendance that an organization of Stout men engaged in teaching printing would be a desirable means of securing cooperation among the members of the group.

A meeting was held for the purpose of organizing, and was attended by twenty-five teachers. An organization was founded which has for its purpose, the exchange of ideas, the solution of each other's problems, and the furthering of the interests of all Stout men majoring in this particular phase of industrial-arts teaching. Officers were elected and plans discussed relative to the work to be undertaken during the ensuing year. Harry Buboltz, teaching in Grand Rapids, Michigan, was elected president, John E. Dorfmeister, teaching in Jackson, Michigan, vice-president, and Russell Landis, of the Madison, Wisconsin, schools, was elected secretary and treasurer of the organization.

Plans were made for the publication of a bimonthly bulletin to which all members are expected to contribute. This bulletin will be printed at the Stout printshop under the supervision of Mr. Hague, head of the printing department. Gilman Dahlen of Detroit, was chosen editor of the publication for the coming year.

It was decided to hold the next meeting of the organization at the Stout Institute, Menomonie, Wisconsin, during the printing teachers' conference which is scheduled to be held there some time during July, 1928.

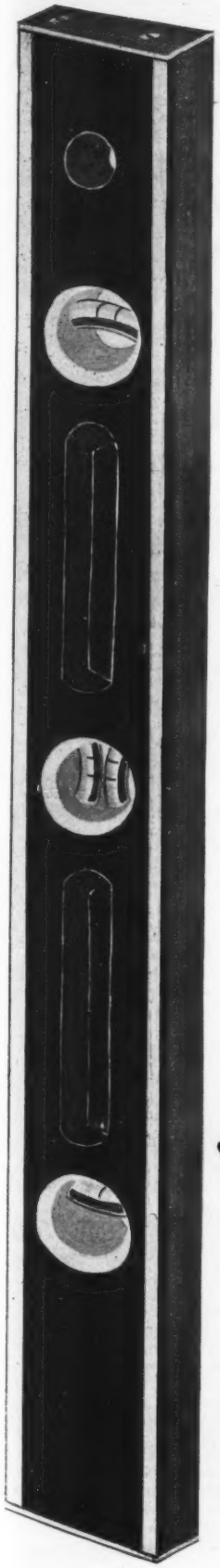
The organization extends an invitation to all former Stout men interested in printing to affiliate with the club.

PROCEEDINGS OF THE REGULAR MEETING OF THE SCHOOL CRAFTS CLUB, NEW YORK CITY

The first fall meeting was held on October 22, 1927, and was attended by 65 members. After the dinner, the president, Mr. Thomas Darling, called the meeting to order and proceeded with the nominating and electing of officers. At the close of the business section, the professional section opened: Mr. Bernard Glaser of the Marquetry Corporation of New York, addressed the members on the subject of marquetry. He said that the imported French marquetry was superior to the American product and was much cheaper. He mentioned that the foreign dyes used in staining the wood were of superior quality and fast, pointing out that the American dye had not yet reached the state of perfection to make it useful for this type of work. Mr. Glaser then introduced Mr. John J. Schwab of the Schwab Piano Company of New York, who distributed catalogs and a number of beautifully mounted specimens of marquetry. His description of the use of this material as a simple and beautiful decoration was lucid and opened a new field to many of the members. He showed how a decorative unit could easily be fitted into a piece of veneer by simply cutting through the veneer with a sharp knife, using the unit itself as a pattern. He showed also how the marquetry design is glued to a foundation slab, preferably 3- or 5-ply material.

The principal speaker of the evening was Mr. A. W. Garritt, director of shopwork for the city of New York. Mr. Garritt's subject was "The Shop Library, its Importance and Usefulness." He commenced his address by proposing the following questions: "What is a library? Is it a building to house books; a case to heap books in; a collection of volumes; or a series of books in circulation which stimulate and enlighten readers? When is a library dead? When should a library be cremated?

(Continued on Page 32a)



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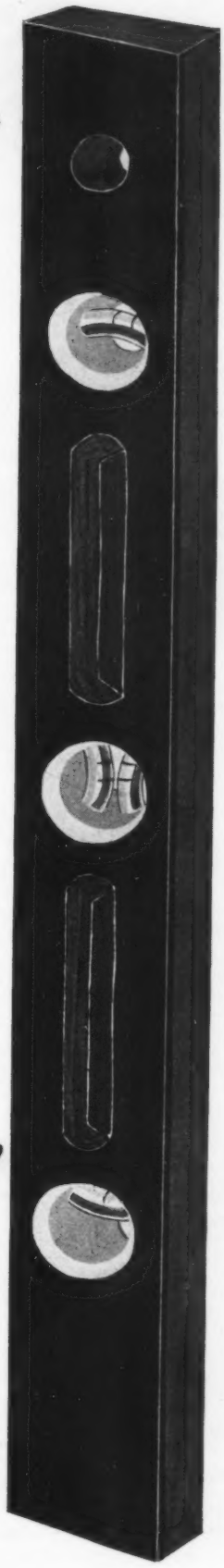

MILLERS FALLS TOOLS SINCE 1868

NO. 124
Plain, 24-26-28-30" two plumbs, two levels.

NO. 224
Brass bound, 24-26-28-30" two plumbs, two levels.

TWO NEW LEVELS *for* MANUAL TRAINING WORK

These two new levels are being offered to complete our line of levels. They have the same high quality as our other numbers and are moderately priced.

Both are white pine, thoroughly dried, with a beautiful red finish. All plumbs in levels have protected glasses.

Our level line now consists of five numbers of carpenters levels and seven numbers of masons levels in pine, mahogany and aluminum. They are good looking levels. They are accurate. They are fully guaranteed by Millers Falls Co.

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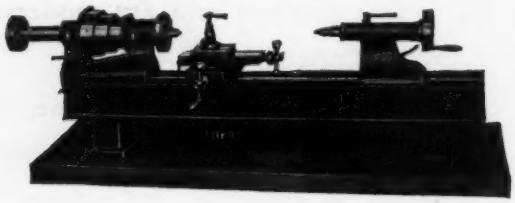
SCHOOL SHOP EQUIPMENT NEWS

For the Supervisor and Teacher who desires to keep abreast with news of new Machinery, Tools, Supplies, etc.

NEW RIVETT JUNIOR BENCH LATHE

The Rivett Lathe and Grinder Corporation of Brighton, Mass., has announced the marketing of the Rivett Junior Bench Lathe No. 507 for use in machine-shop operations. The machine is especially useful for school shops because of the small space occupied by the bench lathe and because of the low initial cost.

The headstock of the lathe is rigidly designed, with adequate means of adjustment to maintain a true-running spindle. The most striking feature is the external taper on the spindle nose, which has a 5-deg. included angle, and which allows plates, chuck plates, and other attachments to be mounted or remounted with assurance of running true. The spindle is made of tool steel, hardened on the front end for the chuck and collet seat, and ground all over externally. The bearing boxes are made of cast iron with straight holes, tapered on the outside and split, so that when drawn into the headstock casting, they are compressed, thus providing a take-up for the side shake. The bed, cast with integral legs, is made in box section, and strongly ribbed to give maximum strength with light weight. The top of the bed is finish machined, and hand scraped to standard gauges, so that all attachments are interchangeable. Each bed is machined and drilled for the screw-cutting attachment which is furnished either at the time of ordering or later.



The tailstock is of the offset type, giving ample clearance for the compound-rest feed-screw handle when working on short work of small diameter. The spindle is made of tool steel, hardened, and ground to one-inch diameter. The spindle has a single measuring line etched on it so that holes can be drilled and counterbored to the desired depth by measuring with a steel rule.

The compound slide rest consists of two slides with a graduated swivel between them and feed screws to provide the slide movements. The base has four flat, hand-scraped, bearing surfaces, so that the slide rest will bear truly and firmly on the bed. There is an adjustable guide plate which permits the slide rest to be quickly set and reset in proper alignment with the front bevel of the bed. When the guide is not in use, the feeds are set at two independent angles.

The swivel is locked in position on the cross slide by an eccentric binder and the graduations are cut on the dial in degrees. The tool rest is of the standard rocker type, the rocker and the clamping screw being hardened. The feed screws are of machine steel and are held in bronze nuts of large size. Adjustment is made by moving the dial along the axis of the screw.

The ball handles are of convenient size for rapid movement and sensitive touch and do not interfere with each other, except when the slide is set less than 45 deg. from the axis of the cross slide. An adjustable stop for the cross slide is provided, for convenience in thread cutting, grinding, and for maintenance of settings in duplicate work.

The lathe is 38 in. long on the bed, and has a length of 17 in. between centers with tailstock flush and 20 in. with tailstock overhanging. It has a net weight of 200 lb., and a gross weight of 260 lb.

RED-I-KUT FURNITURE FOR SCHOOL SHOPS

The Kuempel Company of Guttenberg, Iowa, has recently issued a 23-page pamphlet describing and illustrating red-i-kut furniture projects for school shops. The catalog contains an entirely new line of chests, all embodying the "Safe-T" joint, and other pieces of furniture, including breakfast sets, piano benches, sewing boxes, radio tables, tables, clocks, magazine end tables, and folding screens.

Each piece of furniture is accompanied by accessories, and complete instructions for assembling and finishing.

CLOCK DESIGNS FOR SCHOOL SHOPS

The American Chime Clock Company, Philadelphia, Pa., has a collection of working drawings of clocks, giving detail parts and dimensions for banjo clocks, miniature grandfather clocks, mantle clocks, and a variety of shelf clocks.

The firm is equipped to furnish works, dials, gongs, chimes, etc., for any style of clock.

Copies of these working drawings will be sent to any school-shop instructor who will write the American Chime Clock Company at 1677 Ruffner St., Philadelphia, Pa.

NEW JOHNSON MELTING POT

The Johnson Gas Appliance Company of Cedar Rapids, Iowa, has announced the marketing of a new 18-pound-capacity melting pot for use in metal-working shops. The melting pot is known as the

No. 15 melting furnace and weighs 15 pounds. It has a capacity of 18 pounds and a gas consumption of 15 cu. ft. per hour. It is considered the quickest lead-melting furnace and is adapted for use in plumbing and automobile shops. The melting pot is equipped with a direct-jet Bunsen burner, with shut-off valve and pilot light, and sells at a very small cost.

Information concerning the Johnson melting pot may be obtained by writing to the Johnson Gas Appliance Company at Cedar Rapids, Iowa.

SKINNER CHUCK COMPANY REORGANIZES

The Skinner Chuck Company of New Britain, Connecticut, has announced a reorganization of the firm with the election of Mr. E. J. Skinner as chairman of the board of directors of the company. Mr. Skinner, who was formerly president of the firm, was elected in 1923, to succeed Charles Glover. Mr. S. W. Parsons, formerly of the Stanley Works, has been appointed as president, to succeed Mr. Skinner.

The other officers of the company are: Vice-president-treasurer, Mr. Paul K. Rogers; vice-president, Mr. A. A. North; secretary-salesmanager, Mr. A. B. Skinner; assistant secretary, Mr. A. E. Thornton.

The Skinner Chuck Company has added to its well-known line of lathe, drill, and planer chucks a new line of air chucks, cylinders, and air-holding devices, thus completing a definite forward step in the line of progress made by the firm.

Manual-Arts Teachers of North Dakota Meet. The manual-arts section of the North Dakota Education Association held a meeting on October 27, in connection with the state meeting at Bismarck. Mr. Carl V. Lindeman, president of the section, presided. At the meeting, Mr. E. F. Riley of Wahpeton discussed "Vocational Education"; Prof. Roy Neff of Bismarck talked on "Manual Arts in the Junior High School"; Mr. Carl V. Lindeman discussed "Methods of Finishing and Decorating Cabinet Work"; and Mr. Royal Hayden of Jamestown took for his subject "The General Shop."

(Continued from Page 30A)

"A library should be a thing of life. If its circulation ceases it is dead!

"What is a shop library? A series of books on a shelf, books, magazines, clippings or what? What kind of books belong in a shop library?

"Why do people read—for information, stimulation, new interest or what?

"What type of book should the shop library contain? Books to entertain, poetry, humor or what? Texts? How-to-do books? How-things-are-made books? Books of science or invention? Inspirational books—stories of inventions? World's work? Industrial geography?

"How does your shop library look? Good or bad? Is it next to the glue bench, or the staining table? Is it accessible to the boys? The shop library should be a guide to the boys just as the old cab driver was a guide to the stranger in New York.

"Now I will describe a cabinet or bookshelf having a number of compartments. The largest at the bottom, painted black for books seldom used and those about to be discarded. The next shelf, painted blue and orange with a drawer for clippings and magazines. The next above for newer books and current topics. The upper one (a small one with an electric light) for the one new book.

"Thus a pyramid, beginning with older material and ending with the latest. This is my conception of an ideal case for your library.

(Continued on Page 35A)

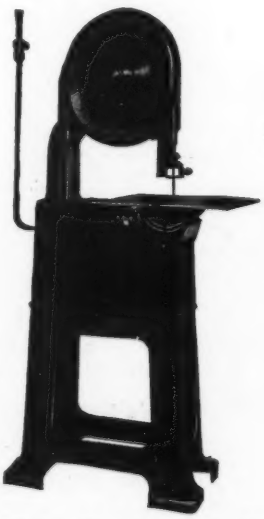
Wallace PORTABLE MACHINES

Built for Men
Safe for Boys

Everywhere accepted as

Standard *for* Schools

No. 8 Wallace Portable Universal Saw



No. 16 Wallace Portable 16" Band Saw

The same exclusive features which have won universal acceptance in business and industry, distinguish Wallace Portable Beltless Machines as ideal for practical school instruction.

VERSATILITY. There is power to spare for all shop woodworking. Each motor is an integral part of the machine itself. There are no belts to slip and waste power. Every woodworking contingency is anticipated in the structural and engineering design of Wallace Machines.

PORTABLE. Wallace Machines operate from any nearby electric light socket. They are light weight, can be quickly and easily moved from place to place. Surprisingly small floor space is required.

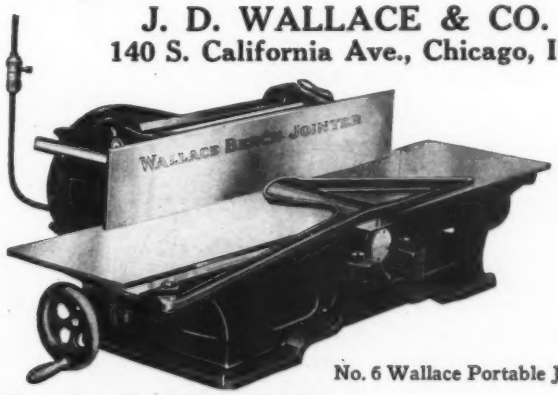
ACCURACY. Heavy planing mill machinery is out of place in the average school training shop. What schools need is light, portable cabinet making machinery. Wallace Machines are powerful enough to do the heaviest job, accurate enough to do the finest work with infinite precision.

SAFETY. Wallace Machines are so compactly designed that a boy can stand in a natural position with both feet firmly on the floor and do his work without leaning dangerously off balance to reach across a wide table. Every blade is carefully guarded. It is practically impossible for a Wallace Machine to injure the operator.*

ECONOMY. Regardless of the amount of funds available for school equipment, it will pay you to examine the Wallace Catalog. The initial cost of Wallace Portable Beltless Machines is small. There is no installation expense. Upkeep is negligible.

FREE TRIAL. Write for the catalog. Send a request for any machine you want to try, cost-free and without incurring obligation. If trying a Wallace Machine for a week or more does not convince you, simply send it back, charges COLLECT. Send today for the Wallace Illustrated Catalog, and details of the trial offer. Let us put you on our mailing list for the Solar-Wallace Plan Service for Instructors. This includes illustrated job sheets which can be used as regular assignments. Send today.

J. D. WALLACE & CO.
140 S. California Ave., Chicago, Ill.



No. 6 Wallace Portable Jointer

**Wallace Portable Beltless Machines equipped with Wallace safety guards, approved wiring and plugs, are listed as standard by Underwriters Laboratories.*

No Artist ever Painted a Masterpiece with Calcimine

YOU wouldn't expect your students to do good work with rusty, broken tools. The better equipment you give them to work with, the better the work they'll do.

Extend the policy to cover the woods they use. Cheaper woods are adequate for the beginners, the lads who are learning to saw, but for the boys who are showing their skill in cabinet work, put genuine American Walnut at their disposal.

Walnut's beauty of grain, its mellowness of tone, its sturdy strength, its freedom from heart-breaking splits and cracks make it the ideal wood for young craftsmen today as it has been for the master craftsmen of all time.

Our descriptive literature on walnut and its qualities is yours for the asking.

American Walnut Manufacturers Association
Room 3404
616 South Michigan Avenue, Chicago, Illinois

AMERICAN WALNUT

Please send me your brochures on American Walnut.

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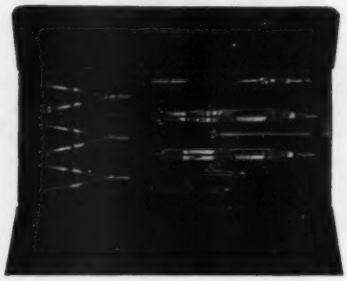
POSTS CHICAGO

DEPENDABLE DRAWING INSTRUMENTS AND MATERIALS



WE SPECIALIZE IN DRAWING MATERIALS FOR SCHOOLS

The products of our shops for that purpose are of the highest quality, workmanship and accuracy, the fact having been recognized by us that an accurate and clean tool will have, and invariably has a beneficial psychological effect on the mind of the student and that it will not only assist him to turn out accurate work but will also help to shape his character.

That is why, today, we count among our staunchest patrons and friends an endless number of Institutions of Teaching and Learning.

Post's Quality has been recognized by them as a Standard by which to judge other makes.

Our line comprises everything needed by a School, from Thumb Tacks to Drawing Sets and from Pencils to Drawing Stands.

A large comprehensive catalog lists, describes and illustrates every item.

Write for Catalog

THE FREDERICK POST

P. O. BOX 803 CHICAGO, ILL.

Rapid Acting Vise
$5.50

Adjustable steel frame bench with one rapid acting vise, $15.50.

Additional vise and drawers extra.

Send for catalogue.

Contentment Industry.

COLUMBIA SCHOOL SUPPLY CO. INDIANAPOLIS, INDIANA

(Continued from Page 32a)

"Next I will give you what educators are pleased to call an awareness test. Are you aware that the good shop library will add one more lure to the shop? Are you aware that the shop library may be an aid in 'vocational finding,' may steer some boy on the right path? Are you aware that it may make some boys familiar with books and teach them to be unafraid of a library, especially if you have a boy librarian?

"Give the name, author, and publisher of a book you think would add to the value of a shop library."

The next speaker, Mr. Julius Eisenstein of the Theodore Roosevelt High School, New York City, talked on "Lesson Plans, their necessity and importance, and how to prepare them."

Mr. Eisenstein emphasized that the student's lack of interest is often traceable to the teacher's tendency to work in a circle, and arrive at nothing. Many teachers do not realize that they are doing this because they have no well-thought-out plan to follow. The right kind of lesson plan must give due importance to each step, and each must have a definite aim or objective.

The several types of lessons, the deductive, the inductive, the anticipatory deductive lesson and the logical approach were then discussed by the speaker.—THOMAS DARLING, *President.*

MEETING OF THE MECHANIC-ARTS SECTION OF THE UTAH EDUCATION ASSOCIATION

A meeting of the mechanic-arts section of the Utah Education Association was held at Salt Lake City, Utah, October 21, 1927, at 2 p.m., under the direction of Pres. Jos. R. Miller.

1. The first subject on the program was: "The Mechanic-Arts Work as Related to Creative and Productive Industry," by D. H. Christensen, former superintendent of public schools, Salt Lake City, Utah. Mr. Christensen read a report which he had made to the board of education of Salt Lake City 25 years ago, recommending the adding of manual-training work to the curriculum. He stressed the value of the work and its future as he saw it then. "The shop teacher has a twofold responsibility: First, that of giving his course real educational value; second, that of training his students so they can effectively measure up in the world of industry." He stated that there is an increasing opportunity for advancement and growth in the vocational lines. The future captains of industry will all be technically trained men and the responsibility for their training will rest upon the industrial-arts instructors. He further stated that within the range of his observation the contractors who are succeeding best today are practical men, technically trained.

2. The second discussion was: "The Report of the Progress on the State of Utah School Program for Industrial Arts for the Past Year," by L. H. Humphreys, supervisor of agriculture for the State of Utah.

3. "Shop Kinks," or teaching devices, were next presented by a number of teachers. Mimeographed illustrations and explanations accompanied each.

4. I. S. Noall, state supervisor of trades and industries and president of the Utah Vocational Association then spoke on "The Utah Vocational Association and its Relationship to the Mechanic-Arts Teachers and the American Vocational Association." Those present voted unanimously to join the U. V. A., and through it the A. V. A. Efforts were then made to organize a motoring party to the American Vocational Association convention at Los Angeles next December.

5. Then followed the election of officers for the year 1927-28 with the following results: President, Henry B. Tanner, Salt Lake City, Utah; Vice-President, Jesse M. Woodhouse, Bingham, Utah; Secretary, Miss Mary Mayne, Salt Lake City, Utah.

6. After the adjournment of the sectional meetings, a representative of the Murphy Varnish Company, gave a short talk on what lacquers are, and how they are made. He also demonstrated how they are used.—H. B. TANNER.

International Conference of Art Teachers. The International Conference of Art Teachers will hold its regular meeting July 30 to August 5, 1928, at Prague. In view of the interest displayed in the meeting it is expected there will be a record attendance of delegates from America.

The space to be devoted to exhibits is rather limited so that the display of articles will be small and of a rather select nature. Work comprising drawing, painting, graphic arts, design and lettering will be grouped and shown as a national exhibit. There will also be exhibits of teaching, outlines of courses, and curriculum building. A small section will be devoted to industrial arts and crafts work, including pottery, textiles, carving, and metal work.

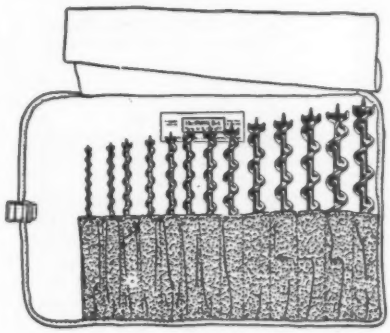
It is expected that the complete exhibit will be shown at the Eastern Arts Convention, to be held in April, 1928, at Hartford, Conn.

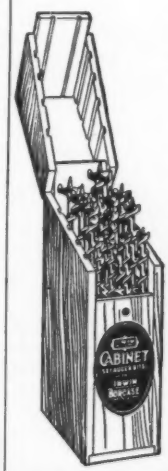
Information concerning the meeting may be had from the American committee on the conference, which is represented by Mr. G. J. Cox, Teachers College, Columbia University, New York City.

special

IRWIN CABINET SET FOR VOCATIONAL AND MANUAL TRAINING INSTRUCTORS AND STUDENTS

13 BITS — STYLE 62 TS





These are the kind of bits the fine cabinet maker uses. They were built for just such work. The screw is pitched to feed at just the right speed for best work. Spurs and Cutters, in fact, the entire cutting heads are specially designed to meet the conditions of vocational education work with its variety of materials. The set includes Irwin Smoothbor Auger Bits in sizes 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16/16ths—Total 32½ Quarters—13 Sizes.

This Irwin Cabinet Set

May be had in either Borkit No. DSR or Borcase No. DS. This arrangement gives an instructor the opportunity of explaining the use of bits, the sizes to use on different work, and it also keeps bits together in better order and condition.

Irwin Cooperation for Instructors

We will be glad to send on request to any students or classes our book "How to Select, Use and Care for Bits." We also have a limited number of demonstration panels showing how bits are manufactured. These panels are available at times for school use. Write us about them.

IRWIN AUGER BIT COMPANY
WILMINGTON, OHIO.

IRWIN *Auger Bits*

The KLUGE
AUTOMATIC JOB PRESS
FEEDER

Knowing How to Save Time and Labor is a most important element in the education and training of student-printers. The KLUGE FEEDER is one of the best mediums for inculcating such a lesson because of its proven ability to deal with all kinds of jobs under varying conditions and its reputation for lowering costs and increasing production at the same time. The young printer who goes into the business world equipped with a working knowledge of the KLUGE FEEDER is qualified to make a success of his business.

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New York, Detroit, Chicago, St. Louis, Dallas, Atlanta, San Francisco, Toronto.

Instructors, Supervisors, and Superintendents should write for a class supply of our descriptive booklet "Let Merit Decide."

PERSONAL NEWS NOTES

Mr. Raymond P. Ensign, of the Art Institute, Chicago, Illinois, has been appointed as educational director of the Art Extension Society of New York City. Mr. Ensign will be located in New York City and will devote most of his time to the interests of the Society. He will continue to act as director of the Berkshire Summer School of Art.

Mr. R. S. Kern, formerly of Dunwoody Industrial Institute, Minneapolis, Minn., has been appointed as instructor in auto mechanics at the Boys' Technical High School, Milwaukee, Wis.

Mr. B. Burling, instructor in the Boys' Technical High School, Milwaukee, has been elected president of the Milwaukee Teachers' Annuity and Retirement Fund Association. There are 2,066 teacher members of the association and the fund is contributed to by every teacher and taxpayer in the city.

Mr. O. B. Badger has been appointed associated professor of industrial education at the University of Missouri. Mr. Badger is stationed at St. Louis where he is in charge of Smith-Hughes teacher-training work. He was formerly at Purdue University where he was in charge of the teacher-training work for Indiana.

Mr. J. P. Lenney has been appointed as a full-time teacher of industrial subjects in the Roosevelt High School, St. Louis. Mr. Lenney was formerly supervisor of industrial education in St. Louis.

Mr. F. W. Bopp is instructor in patternmaking and wood turning in the Manual-Training High School, Kansas City, Mo.

Mr. John M. Fecher of Montclair, New Jersey, has been appointed state supervisor of foreman training. Mr. Fecher is a graduate of Pratt Institute and was formerly principal of the Essex County Vocational School.

Mr. Russell J. Greenly, formerly director of vocational education at Abington, Pa., has become head of the vocational teacher-training department in the University of Akron, Akron, Ohio.

Mr. H. H. Diller of Carlisle, Pa., has accepted a position in the Wincroft School which is connected with the Hill School at Pottstown.

Mr. C. G. Ryther, formerly a teacher at the Technical High School, Buffalo, New York, has been appointed as head of the science department, to succeed Mr. R. R. Dry. Mr. Ryther is a graduate of the Technical High School and of the Michigan State College.

Mr. J. E. Beck has been elected principal of the Barret Manual Training High School at Henderson, Ky., to succeed Mr. T. B. Sporing.

NEWS AND NOTES

RELATED SUBJECTS AS TAUGHT AT THE LATHROP TRADE SCHOOL

The Lathrop Trade School at Kansas City, Mo., has endeavored to give every advantage to boys in the printing department and has added another room in which it will be the aim to teach purely related subjects. This latest addition rounds out the printing course and makes the department one of the most complete in that section of the country.

Under the plan, mathematics is taught with the use of real problems met by printers. In drawing, the work consists of layouts and designs of the job in hand. In business practice, the student is given a few of the fundamentals in order that he may have a more general knowledge of the processes through which a job of printing must go. The student is trained to make quotations on jobs and to make his price based on the actual cost of the job. The aim is to assist the student in figuring costs by giving him problems related to the actual jobs which he is required to work out during his shop period.

Announce Fourth Annual Hoosier Salon. The Hoosier Salon Patrons' Association of Chicago, Illinois, has announced the fourth annual Hoosier Salon, which will be held in the Marshall Field Galleries from January 28, to and including February 15, 1928.

Artists eligible for the exhibition include any native-born Indiana artist, any artist who received his art training in Indiana or who has resided in the state for five years or more, or one who is definitely identified with an Indiana group of artists and who returns to the state for brief sketching trips.

More than $5,000 in prizes will be awarded to winning exhibitors. In addition to the usual prizes given each year there will be the following prizes: Three prizes of $150 each to be awarded to women artists by the Tri Kappa Sorority of Indiana; a prize of $250 to be awarded for a picture selected as the best by popular vote and which has not received a prize from the jury; a prize of $250 will be given by the Indiana Limestone Company for the best piece of carved limestone.

All entries must be in not later than January 13, 1928. The winning designs will be available for exhibition purposes in any part of the United States after February 15.

Information concerning the Hoosier Salon may be obtained from Mrs. C. B. King, Graemere Hotel, 113 N. Homan Blvd., Chicago, Illinois.

A PROFITABLE SUMMER-SCHOOL PROJECT

The public schools of Hastings, Nebraska, under the direction of Mr. C. E. Sharpe, supervisor of manual training, and with the cooperation of Supt. A. H. Staley, conducted a profitable summer school this year. A course in vocational agriculture had been conducted during the past year and it was proposed to follow this with a program for town boys with distinct mechanical aptitudes, thus providing them with opportunities similar to those offered the farm boys in the agricultural courses. In the working out of the idea, Supt. Staley worked with Mr. Sharpe in outlining the plans for an industrial summer school in trade training.

The summer school which enrolled twelve boys, was conducted for eight weeks and offered instruction in interior carpentry, cabinet-making, and millwork. The class was operated upon a 45-hour-week basis, with sessions from 7 a.m. to 4 p.m. daily, except on Saturday, when the work closed at noon.

The problem of providing practical productive work for students is one which usually faces administrators in the establishment of any kind of vocational classwork. The solution of the problem in Hastings was made comparatively easy by certain problems in remodeling, refinishing, and equipping which grew out of the erection of two new school buildings.

Because of the character of the program, considerable care was exercised in the selection of the group of students. For the work done in summer school, each boy was given one year's shop credit which is applied upon graduation from the high school. In addition to this, the students were paid by the board of education a wage ranging from ten to thirty cents an hour.

The expense of the board of education, exclusive of power and the instructor's salary, was: Lumber and hardware, $941.85; finishing materials, $57.85; wages to students, $500; total, $1,499.70.

The class record of accomplishment, together with its appraised value, is as follows: 62 tables, at a cost of $1,152; 60 kindergarten tables, at a cost of $660; 20 teachers' desks, at a cost of $500; 2 library magazine racks, at a cost of $100; 1 library receiving table, at a cost of $100; 1 cabinet, at a cost of $100; 18 art desks, at a cost of $270; 1 magazine rack, at a cost of $25; and 1 bulletin case, at a cost of $25, making a total of $2,932 for the entire group.

The projects listed above do not include other work done by the class, such as remodeling and refinishing the home-economics laboratory, rebuilding 20 mechanical-drawing tables, rebuilding a shop-locker cabinet, and general repairwork of the type needed around a school plant during the summer months.

It is the experience of Hastings that a summer course has some distinct advantages. It provides the boys with instruction of a distinct vocational value; it gives the boys credits which may be applied upon graduation; it utilizes needed school production for educational purposes and gives the board equipment at much less expense than it could be purchased in the open market, and it makes possible a small bank account which may be used to defray school expenses during the ensuing year.

STOUT STUDENTS COOPERATE IN MODEL HOME-FURNISHING PROJECT

The students of the home-furnishing class of Stout Institute, Menomonie, Wis., cooperated with the high-school class, in October, in the planning, selecting and installing of furnishings for the model home built by a local lumber company for the mayor of the city.

The work of planning and selecting the furnishings was completed in a little more than two weeks under the direction of Miss Lillian Carson. The class from the junior high school designed and made the curtains for the rooms, while others assisted in designing, cutting, stitching and pressing the curtains.

The senior-high-school groups studied the floor plans of the house, inspected furniture, designed color schemes, and planned the selection of pieces of furniture to be used. They also assisted in the cutting and making of the curtains and the painting of some of the furniture.

The Stout class assisted in planning and selecting the furnishings. The laboratory was turned into a shop with Miss Carol Gabelein acting as inspector for the high-school class, and Miss Lillian Carson for Stout class.

The model home, as completed and furnished, is considered ideal and reflects great credit on the students who so ably planned and selected the furnishings in harmony with the interior arrangements.

Conference on Chemistry. A conference on chemistry was held October 19 to 22, at Wittenberg College, Springfield, Ohio, in connection with the dedication of the new chemistry-psychology building of the College. Among the speakers at the conference were Mr. Wm. E. Henderson, who spoke on "The Place of Chemistry in the Schools of the Orient"; Mr. Alexander Silverman, who talked on "The Future of Chemical Education"; Mr. H. P. Cady, who discussed "Physical Chemistry"; Mr. H. N. Holmes, who talked on "The Place of Research in College," and Col. H. L. Gilchrist, who talked on "Chemistry in War and Its Medical Significance."

New Booklet on Vocational Laws. The Indiana Department of Public Instruction has issued a new bulletin on vocational laws. The bulletin is known as Bulletin No. 90 and is entitled "Laws and Regulations Governing Vocational Education."

Drawing Tables

—for Any School
—for Any Size Class
—for Any Number of Students

For 8 Students
No. 205

Provides individual accommodations for 8 students. Four compartments open to the front and four to the rear, holding drawing boards and other equipment. This desk takes care of the greatest possible number of students in the same room.

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No. 220

One of our best sellers—very roomy and comfortable, with an adjustable top. Very popular for high schools — 6 compartments for 6 students—each containing drawing board, T square, triangles, paper, and instruments.

For 4 Students
No. 240

A good type of Drawing Table for Universities. Provides accommodations for four students, each with individual drawing board compartment and individual drawer for instruments, both locked with same padlock.

The old order is passing—modern schools are becoming equipped with attractive and highly efficient Kewaunee Drawing Tables.

The Kewaunee line comprises Tables designed for two to eight students — all designed for the greatest compactness, comfort, and convenience. They are firmly constructed to insure rigidity for long service under rough student usage. Finished in Light Golden Oak—the standard Kewaunee finish—or we match any special finish desired.

We are manufacturers of a very complete line of Art and Mechanical Drawing Tables. Write for our complete Book of Illustrations.

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LABORATORY FURNITURE EXPERTS

Designers and Manufacturers of Art and Mechanical Drawing Room Furniture for Schools and Colleges

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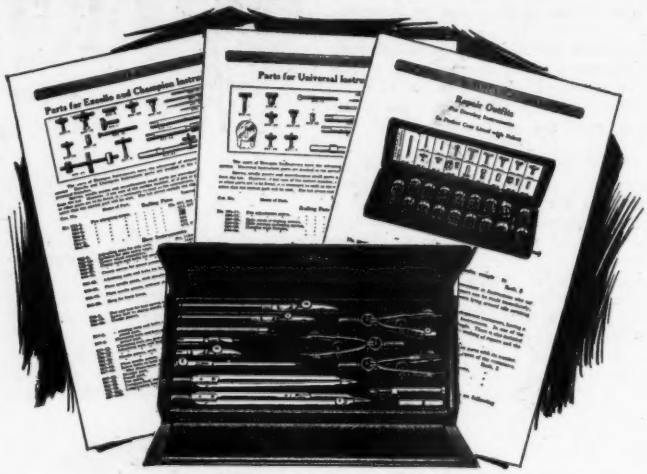
Means to the Student

To the Student Dietzgen Standardization means that his set is always in perfect condition and good repair. His work need never suffer from the lack of some vitally necessary part which has been damaged, and which with ordinary instruments might result in a wait of weeks before the required repairs could be made. Dietzgen Standardization has enabled us to furnish service kits, AN EXCLUSIVE DIETZGEN FEATURE, which will keep the students' drawing instruments in excellent working condition at all times.

Universal Drawing Instrument Set No. 1057C illustrated, is one of the most popular and practical of all sets for vocational and high school use.

Dietzgen Drawing Instruments, made exclusively in Dietzgen Factories, are thoroughly *standardized;* the *parts* in each grade are *interchangeable.* These *parts* are listed in our catalog for your convenience and give you *complete replacement* and *repair service* at your finger tips. The users of Dietzgen instruments are thus assured of the highest quality with a life-time of reliable, satisfactory service.



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Means to the Instructor

To the Instructor Dietzgen Standardization means that all his students will be better students, and that none will be behind in his work because of broken or "out of repair" instruments. One DIETZGEN SERVICE KIT will keep forty to fifty drawing sets in good repair and perfect working condition for many years, no matter how many hours a day they may be used. There's a service kit for every grade of Dietzgen Drawing Instruments. Write for descriptive literature which tells all about this exclusive Dietzgen feature and how it will help you in your classes.

In the background are a few Dietzgen catalog sheets descriptive of Dietzgen service kits and repair parts.

Indiana Vocational Meeting. The Indiana Vocational Association held its annual meeting on October 20, in the Claypool Hotel, Indianapolis, Ind. Mr. Roy P. Wisehart, state superintendent, and Mr. Lewis A. Wilson, state vocational director of New York state, gave the principal addresses. The association was organized in October, 1921, and has grown from 135 members to 259 members.

Forestry Courses in Mississippi Schools. Forestry has been introduced as a study in ten agricultural high schools in Simpson county, Mississippi, according to reports of the Forest Service of the U. S. Department of Agriculture.

The report shows that ten schools in Simpson county have introduced the study, with the setting aside of plots of ten to forty acres each for forestry demonstration purposes.

This year the county plans include the laying out of plots and the study of forestry by the schools and members of the school club, under the supervision of an extension forester. It is planned to extend this school forestry work throughout the state.

On the same program, Earl Ferns of the Northern State Teachers College, read a paper on "Home Mechanics as a Basis for the General Shop." He pointed out clearly that the home-mechanics and general education aims for manual arts were most important. He advocated a gradual development from the wookworking shop to one having facilities for electrical and sheet-metal work. With even a limited equipment a good course in home mechanics can be given and such a shop is not beyond the ability of one teacher to manage.

Another interesting number was the presentation of a completely outlined course in structural-steel drawing by A. W. Holmberg, mechanical engineer, Corrigan-McKinney Steel Company. Mr. Holmberg urged that more attention be paid to structural-steel drafting in high-school drawing courses because of the increasing importance of structural steel in construction work.

Industrial Exhibit. During the week of October 5 an industrial exhibit was held in the state armory at Lawrence, Mass. The exhibit included displays of work in North Andover, Andover, Methuen, and Lawrence and was representative of elementary-, high-school, and continuation-school work. The school exhibit was arranged in a side room near the main entrance and contained numerous articles turned out in the manual-training and household-arts classes.

The exhibits of the diversified industries of Lawrence was representative of the best manufactured products and included woolen goods, soaps and washing powders, paper-mill machinery, bobbins and shuttles, loom harness, mill and factory brushes, leather belting, cotton and worsted cloth, linen yarn and thread, textile shields, pumps and engines, and builders' finish and cabinetmakers.

Mr. E. E. Parlin, of Lawrence, who reported on the exhibit, was instrumental in the arranging and display of the school exhibits.

INDUSTRIAL DISABILITIES PROVIDE MINORITY OF REHABILITATION CASES

The Federal Board for Vocational Education, in a statement issued on October 18, states that industrial accidents furnish less than half of the cases handled by the state rehabilitation departments. In the beginning of the work it was believed that industrial injuries would comprise the bulk of the cases to be handled. Recent studies show that in 1926 only 49 per cent of the cases originated in employment accidents, while 19 per cent came from public accidents, 27 per cent from disease, and 5 per cent from congenital conditions.

It has been found that only 13 per cent of the persons rehabilitated are women, and 72 per cent of all cases are orthopedic disabilities. Rehabilitation through training is recommended as the most lasting and worth-while method of assisting a disabled person to reestablish himself in the world of work.

The board points out that there are three types of training in the rehabilitation service. School training covers all types of instruction as given in the public and private schools by tutors and by correspondence schools. Employment training is a form of instruction provided in commercial or industrial establishments whereby the disabled person learns to perform a specific job or occupation by doing that job under actual conditions of employment. Employment training is used, as a rule, when school training is not available, or the disabled person is not susceptible to school training. Rehabilitation is effected through school training in 39 per cent of the cases; through employment training in 16 per cent, and through job restoration in 45 per cent of the cases.

It is pointed out that women are not as liable as men to suffer injuries from hazardous employment. Employment accidents cause four times more men than women to become disabled. The statistics show that more women than men drop out of industry after injury, even before the period of compensation is passed.

In all the rehabilitation work, emphasis is placed upon the need of selecting cases on the basis of eligibility and susceptibility for the service. Selecting the cases which are really vocationally handicapped, and limiting the service to those who can be fitted to do work as it is done under normal conditions, means service to larger groups of young persons, since it is found that 57 per cent of the cases handled in 1926 were under 30 years of age.

Gerstmeyer Tech. High School, Terre Haute, Indiana
Harding Jr. High School, Steubenville, Ohio
Vocational High School, Fort Worth, Texas
Masonic Home and School, Fort Worth, Texas

Among the basic school subjects PRINTING *is second to none in its educational influence*

To give to young people an opportunity for the greatest amount of success in life—to give them a fair start—is the desire of every school system. As no other form of work correlates with more lines of school work than does the printing subject, and none is more interesting, it may be profitably offered in every school, whether large or small. Not only do students of printing receive the benefit of the course, but the school system as a whole is helped, as its influence goes beyond the room where it is taught.

Educators who want to be well informed on the printing subject should write for a copy of *"The School Printing Department,"* a brochure that explains it fully.

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CARPENTRY JOB SHEETS

1927 Series (Just Out)

Recommended for

Day School Trade and Technical Classes

Carpentry Apprentice Classes and as

Short Unit Courses for Journeymen

These lesson sheets have been produced with the cooperation of the *New Jersey State Department of Public Instruction* along with the principals and instructors of many vocational schools throughout the State. All of the schools that adopted these sheets last year are using them again this term and additional schools have adopted them this year for the first.

The following list indicates the schools in New Jersey now operating special classes for carpentry apprentices and also using the carpentry job sheets and reference pamphlets:

Atlantic City, Boys' Vocational School
Bayonne Vocational School
Elizabeth Boys' Vocational School
Essex County Vocational Schools
  Irvington Boys' Vocational School
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Hackensack High School
Jersey City, Dickinson High School
Middlesex County Vocational Schools
  New Brunswick, Vocational School No. 1
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We have a helpful list of "Good Suggestions" for instructors who can use these sheets. A copy will be sent on request.

Sheets are 6 x 9, four pages per "sheet"

1926 Series (23 sheets).....**$1.15**
1927 Series (23 sheets).....**$1.15**
Five Carpentry Reference Pamphlets, 346 Pages.....**$2.85**

Send for your set on approval
or
[Inspect them at our Booth No. 42, A. V. A. Convention Los Angeles, California, December 17-20, 1927.]

OTHER SETS OF JOB SHEETS

Mechanical Drawing, 25 Blueprint Sheets.....**$1.25**
Printing, 35 lesson sheets (four pages each).....**$1.50**

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Send me on approval your texts on the following subjects:
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I agree to return them if not adopted in my classes or to remit for same.
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Position.....
School.....
Address.....

SEASONAL EMPLOYMENT IN COLORADO AND CALIFORNIA

Approximately 25,000 workers will find seasonal employment in Colorado in harvesting the large sugar-beet crop in October, November, and December, according to a survey just made by the department of labor regarding winter employment. California will also supply seasonal occupation for many workers in harvesting operations until the end of the year.

In Oregon the outlook for industrial employment is not promising. Lumbering is picking up in Washington, while agricultural activities have about ended for the year.

The full report of the survey of conditions in Colorado and the Pacific Coast states is as follows:

Colorado. While employment will increase during the next 60 days, particularly in connection with fall harvest work, coal mining, railroad-freight operating departments, and in some lines of manufacturing, the supply of labor in Colorado will be sufficient to meet all demands. Practically all seasonal outdoor work will be over by December 1 and a large number of laborers will be released.

Approximately 25,000 workers will be employed during October, November, and December in connection with the harvesting of the large sugar-beet crop. The beet-sugar factories are now operating and will afford employment to about 10,000 people for a period of from 60 to 120 days.

Three hundred and fifty men will soon be employed in a large cement plant which is practically completed. The rail department of a steel plant at Pueblo will resume operations about the middle of October, giving employment to 400 workers.

Lumbering activities will gradually decline as the winter approaches. Employment in the meat-packing plants will increase during the next three years.

Flour-milling plants are gradually increasing production and forces. Canning factories will end their seasonal runs during October.

Metal mining is expected to continue on a steady basis for the next few months. There will be a seasonal increase in coal-mining production and employment.

Building and general construction will decrease; work on the six-mile Moffat railroad tunnel is nearing completion, when approximately 1,000 men will be released.

Railroad-shop and maintenance-of-way employment will show a gradual reduction during the next few days.

Report for Pacific division comprising the states of Washington, Oregon, and California:

California. Harvesting the fall crops is later this year, but will provide employment for laborers for about 60 days. Operations in the lumbering industry will be seasonably curtailed during the rest of the year.

In California there will be no increase in the demand for manufacturing labor. Oil-field activities will provide employment for many workers.

A fair volume of building is under way, although in some localities a surplus of building tradesmen already exists.

In Oregon industrial prospects are not very encouraging for the remainder of the year.

There has been a considerable slowing up in the building industry which has caused a good deal of unemployment.

In the lumber industry, skilled loggers in fir districts are well employed, and the camps will continue to operate as long as the weather conditions permit. In the pine districts, however, curtailment has taken place.

All mills have discontinued their night shifts and the day shifts will run as long as favorable weather continues.

In Washington building activities for the remainder of 1927 will probably remain at normal levels for this season of the year.

Lumbering has gradually increased since the slack period of the midsummer months when the fire hazard caused a cessation of activities. Agricultural activities will continue to make heavy demands for workers until about October 20, after which the customary seasonal unemployment conditions will prevail.

Canneries have been operating at full capacity, but as their seasonal activities end they will soon release large numbers of workers. The mining industry is active, but no increase in employment is anticipated in excess of the normal turnover.

Offer Training for Industrial-Arts Teachers. The Kansas State Teachers' College of Pittsburg, Kans., is meeting a constantly increasing demand for teachers of the industrial arts and related subjects through its teacher-training courses. The college has furnished teachers of industrial arts to school systems in all parts of the country. A partial list of the cities which have employed the graduates of the teacher-training course comprises Fort Smith, Ark.; Sherman, Tex.; Leheighton, Pa.; Bryan, Tex.; Ironwood, Mich.; Kansas City, Kans.; McPherson, Kans.; Cleveland, Ohio; Copan, Okla.; Altoona, Pa.; Bonner Springs, Kans.; Springfield, Mo.; Joplin, Mo.; Bartlesville, Okla.; Paducah, Ky.; Tampa, Fla.; Abilene, Kans.; Durham, N. C.

ANVIL DRAWING INSTRUMENTS

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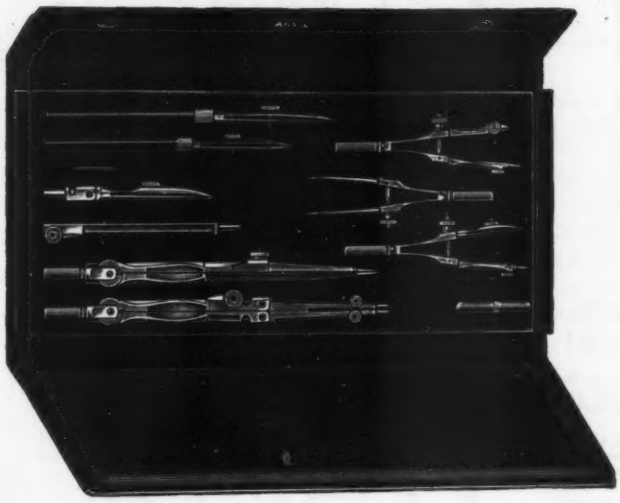

FILL A LONG FELT WANT for both classroom and drafting room. Price within reach of the student and of quality that welcomes them into the professional drafting room. Instruments are made of nickel silver, with pivot joints and straightening device on both compass and hairspring divider.

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Drawing Materials, Mathematical and Surveying Instruments, Measuring Tapes

Manual-Arts Teachers of Rhode Island Meet. The Rhode Island Association of Manual Arts and Drawing held a meeting on October 28, at the Rhode Island School of Design, Providence. At the meeting Miss Erica M. Brooks, of New York City, gave a talk on the subject, "Finding Art Expression Through the Senses." At the close of the meeting a business session was held.

The following have been named members of the Arkansas state vocational board of education: Jerry Nutt, Mound Ida; W. T. Blount, Plainview, and Abe Cullins of De Queen.

Building News

East Chicago, Ind. A six-room addition will be erected for the Industrial High School to give opportunity for more extended work in vocational and industrial work.

The National Committee on Wood Utilization, of the United States Department of Commerce, Washington, D. C., will undertake a special study of dealing with the economies of wood utilization in building and construction work. The report was prepared by a subcommittee on which lumber-consumer associations and professional bodies were represented.

A tentative outline of the extent of the study indicates that it will contain a study of the characteristics of woods used in construction, framing and construction for small houses and farm buildings, industrial and miscellaneous buildings, roof trusses and arches, bridges and trestles, wharves and docks.

The work is being prepared and sponsored by a committee representing the American Institute of Architects, the American Society of Civil Engineers, the Associated General Contractors, the National Association of Builders' Exchanges, the American Society of Agricultural Engineers, the National Association of State Highway Officials, the American Railway Association, and other similar groups of organized lumber consumers.

THE VANDERPOEL ART ASSOCIATION OF CHICAGO

The Vanderpoel Art Association was formed in Chicago, in 1904, in response to a suggestion on the part of friends of Mr. John H. Vanderpoel that his memory be perpetuated by contributing works of art to be placed in the Vanderpoel School. The collection of pictures, etchings, and drawings was intended to form part of the educational equipment of the pupils and to become a permanent art exhibit for the general public. The Chicago board of education cooperated with the group by offering space in the building for this purpose.

An invitation was given to a number of artists which was followed by a generous and immediate response. The result is a collection of more than two hundred original works of art in this school. They are the work of Chicago artists, friends, and students of Mr. Vanderpoel, and also artists who began their careers in Chicago. It represents a permanent representative collection of the work of American artists. Several times a year the school is opened at night and the public is invited to enjoy the collection.

There are now more than seven hundred members of the Vanderpoel Art Association. They pay a nominal annual fee for membership and the money is used to frame pictures and to take care of the collection. A scholarship at the Chicago Art Institute is awarded each year to some deserving student.

The association is similar to one established in Pittsburgh in 1916, and which now has one hundred members engaged in work of the same character.

PROGRESS OF VOCATIONAL EDUCATION IN INDIANA

Vocational education in Indiana has gone a long way since February, 1913, when the Indiana vocational law was passed. Vocational education in the state has progressed both in ideals and in action, and growth has been made professionally as well as physically.

During the first year, vocational departments were organized in only 15 cities and communities, while in the second year, this was increased to 35. Of these 35 school departments offering work in vocational education during the year, 15 had courses in agriculture, 23 in home economics, and 11 in industrial education. Since that beginning the work has grown until in 1926-27 there were 130 high schools with courses in agriculture, 86 with courses in home economics, and 32 with industrial-training programs. There were 5,335 boys enrolled in the work in agriculture, 7,481 girls and women in home economics, and 14,075 boys and men in industrial education.

A large proportion of the departments in agriculture and home economics are located in the central part of the state, while most of the industrial departments are to be found in the large industrial and manufacturing centers.

The work has grown in a normal and conservative manner. For the year 1927-28, 139 high schools will be offering work in agriculture, 89 in home economics, and 32 in industrial training.

Establish Hall of Fame. The Thomas Jefferson High School in New York City has taken the initial steps toward establishing a hall of living leaders in industrial arts. The plan is similar to that of the New York State University but only living leaders will have a place in the newly established hall.

No. 6120
Manual Training Table.

• • • not alone finest furniture, but highest teaching efficiency!

SHELDON Engineers fit SHELDON Furniture to your needs. Free furniture floor plan drawings made especially for you show how you can get the most modern teaching efficiency possible.

Our most popular number, No. 6120, as illustrated, is a very strong, versatile, and good-looking table. The ample size and position of vise allow holding of such large pieces as chair seats and table tops.

Write for new, illustrated 168-page catalog and complete details on SHELDON Free Engineering Service. Start your school towards highest teaching efficiency with SHELDON Industrial-Arts Furniture.

E. H. SHELDON & CO.
Furniture for Vocational Education
MUSKEGON, MICHIGAN, U. S. A.

Steel Spindle Hand Screws—Standard Sizes
(Strong—Durable—Satisfactory)

Standard Carriage Clamp—Sizes 2½" to 12"
(Either Button or Oscillating Tip)

Steel Bar Clamp—Sizes 2' to 10'
(All Metal "T" Handle if preferred)

We manufacture a complete and up-to-date line of Clamps, ranging in size from 1 in. to 10 ft. opening, also many other improved mechanics' tools which should interest you. Write for our new catalog.

Ask your dealer for HARGRAVE QUALITY TOOLS

THE CINCINNATI TOOL CO.
Established 1879
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CINCINNATI, OHIO

For Your Manual Training Classes!

All-Metal floor or Bridge Lamp

Just what you need to hold the interest of every pupil—practical and substantial. Has proven a winner with manual training instructors wherever tried. Many schools now are lamp enthusiasts, ordering from two to several dozen on first repeat order.

Special offer now to introduce this practical fixture to manual training schools. Sample set, one to a school, only $2.45, postpaid, for complete materials including castings, bridge arm, and pull chain socket. Student furnishes own pipe, wiring, and finishing. Directions for erection with each set. Easy to erect a lamp that would retail for $8.00 to $15.00 each.

Order a sample set now. If it is not what you want return at our expense. Your money will be refunded. If a junior floor lamp set is preferred, send only $2.15.

Midwest Lumber Company
Appleton, Wis.

Lumber, Lamp and Shop Supplies Exclusively for Schools. Write for Literature.

ONLY **$2.45** Postpaid

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Whatever your glue-heating needs, we can supply you from our large line of glue pots and glue heaters.

Sta-Warm
Electric Glue Heaters and Glue Pots

have patented features that make them fool and trouble-proof—and often cut glue bills in half.

Distributors for the Woodworking Industries
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GRAND RAPIDS — MICHIGAN

The Proper Finish for Projects of Wood

THE finishing of projects of wood is most important and should receive its full share of attention. Every Instructor of woodworking realizes that a beautifully constructed model may be ruined if improperly finished, whereas the defects of poor construction are minimized if the model is well finished.

For years we have kept our fingers on the pulse of progress of Industrial Arts and Vocational Education. We have striven to meet their Wood Finishing needs. That we have been successful is demonstrated by the fact that Johnson's Artistic Wood Finishes are used in nine-tenths of the schools in the United States and Canada. The endorsement of the world's foremost Instructors of Industrial Arts and Vocational Education is a convincing tribute to the merit of our products.

Our line of Artistic Wood Finishes is complete—it includes *Johnson's Wood Dye, Paste Wood Filler, Under-Lac, Polishing Wax, Varnishes, Enamels,* and *Undercoats.* They are all easy to apply—the youngest and most inexperienced pupils can use them with splendid results.

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17 Beautiful Shades for STAINING WOOD

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FREE—*this valuable book*

Our new "Text Book on Wood Finishing for Instructors and Students of Industrial Arts and Vocational Education" is just off the press. Wouldn't you like a copy for each boy studying woodworking? We will gladly send the required number Free and Postpaid to Instructors who are using or will use Johnson's Artistic Wood Finishes in their woodworking shop. Use coupon at right.

We have a complete set of Wood Finishing Job Sheets (eight in all) which show job specification—job application—material—tools and equipment—procedure, etc. We will gladly send these Job Sheets postpaid and free of all charge to Instructors of Wood Finishing.

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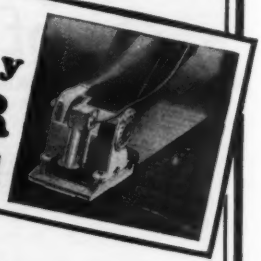
This Double-Duty SANDER Pleases All



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Your Classes! Your students have the thrill of working with the industrial sander they will use later on. They develop the pride in good workmanship made possible by the CLARKE. They like to work with this 22 pound, easily operated machine which does not tax their strength—which makes any kind of sanding job fun—instead of drudgery. **They appreciate the absolute elimination of dust achieved only by the CLARKE;** that insures clean clothes, and clean air to breathe.

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VACUUM PORTABLE SANDER
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Every School Now Can Have A Woodworking Department

The cost of equipment is no longer an insurmountable factor for the small school. With a Tannewitz Combination Woodworker and very little additional machinery a complete and thoroughly practical department can be equipped at a small fraction of the usual cost and little floor space is required.

The Tannewitz Combination Woodworker performs perfectly the functions of a standard mitre saw, on which all sawing operations may be done, a boring machine, mortiser, jointer, and band saw. It is ball bearing throughout—built to give many years of service. Perfectly safe and convenient for three people to work at simultaneously. Attachments put in motion or stopped without shifting belts or clutches.

Write for bulletin E-2 giving complete description and prices with or without various attachments.

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E. C. BREESE,
Manual Training Instructor,
King Edward School,
Walkerville, Ontario, Canada.

Won't you let us demonstrate what a Foley will do for you? Send us a saw—we will file it on the Foley so you can see how much cleaner, truer, and faster your saws will cut when they are filed and jointed by machines. We'll also keep track of the filing time so you can see the hours a Foley will save you. It will save your eyes, too.

FOLEY
Automatic
SAW FILER

Files all kinds of hand saws, band saws ⅛" to 4½", cross-cut circular saws 3" to 24". More than twice as fast as hand filing. Entirely automatic. Mechanically precise. Keeps saws in "like-new" condition. Re-tooths old hand saws. Let us demonstrate — Write for a complete illustrated description of the Foley, or details of our Saw Filing Service for Manual Training Schools.

FOLEY SAW TOOL CO., Inc.
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The Disston No. 36½ Hack Saw—a fine tool for all-around shop use.

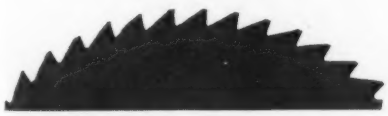
Disston No. 200 Hack Saw Frame

Ideal for working in close quarters. Takes 8-inch blade. Depth 1 inch from tooth edge to inside of back. Steel frame, square stretcher, reversible to three positions, hardwood handle. A favorite for lathe, electrical, and auto mechanics.

Instructors in metal working *demand* quality in cutting tools

DISSTON NO. 36½ ADJUSTABLE HACK SAW.

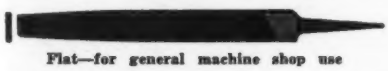
Sturdy steel frame adjustable from 8 to 12". Back solid as a rock. Stretchers can not fall out when changing blades. Hardwood handle is placed to give correct thrust for easy work.



DISSTON METAL-SLITTING SAWS. Hardened by special process and accurately ground thin toward center for clearance. Cut fast and clean. Made in all sizes from 2½". Write for details.

DISSTON FILES

Disston Saws are sharpened with Disston Files, taken from regular stock. They do more and better work for you.



Flat—for general machine shop use

Half Round—for flat and curved work

Mill—for smooth and draw filing

THAT is the reason why Disston Hack Saw Frames and Blades, Disston Metal Cutting Saws, and Disston Files are standard equipment in industrial arts shops.

Instructors know—and students soon learn—that there is no substitute for Disston QUALITY.

Every Disston tool is made of Disston steel, developed in the world's largest saw factory, where America's first crucible and electric furnace steels were made.

Every Disston tool is made to do its special work better and easier. Take the Disston 200 Hack Saw Frame, for example:

It is narrower, so you can get at work that you can't reach with a wider frame.

It is sturdy—Disston steel, strongly riveted.

It is handy—quickly adjusted. It goes into tight places, where it can be controlled with one hand.

And Disston metal cutting tools are *tested by use* every day in the Disston Works. In a Disston Hack Saw frame or blade, file or metal slitting saw, you get the same quality that Disston mechanics require for their own work, in cutting metals day after day, year in and year out.

Have you the "Disston Tool Manual for School Shops"? 206 pages, each crowded with facts of practical value to you and your students. A letter to us will bring it to you.

HENRY DISSTON & SONS, INC.
Makers of "The Saw Most Carpenters Use"
Philadelphia, U. S. A.

DISSTON

Real tool economy starts with genuine Maydole Hammers

See that the tool your pupils use the most has a head of press-forged special tool steel and handle of selected, clear, air-dried second-growth hickory. There's a lifetime of use and abuse in the hammer so carefully made.

Your dealer will show you Maydole Hammers in the styles and weights you need.

Write for our Catalog and interesting Pocket Handbook 23 "H."

YOUR HAMMER SINCE 1843

Maydole Hammers

The David Maydole Hammer Co., Norwich, N.Y.

1395

CIRCULAR SAWS FOR SMOOTHER, FASTER CUTTING

School shops should equip with Simonds Circular Saws because they give longer service, cut faster, and hold their edge longer.

Get our catalog and prices first.

SIMONDS

SAW AND STEEL CO.

"The Saw Makers"

Established 1832—Fitchburg, Mass.

Chicago, Ill.	Memphis, Tenn.	Los Angeles, Cal.
Boston, Mass.	Atlanta, Ga.	Seattle, Wash.
Detroit, Mich.	London, England	Montreal, Que.
New York City	Portland, Ore.	Toronto, Ont.
New Orleans, La.	San Francisco, Cal.	Vancouver, B. C.
Lockport, N. Y.		St. John, N. B.

USE *ACCURATE* TOOL GRINDERS

ACCURACY is essential in a good, long-lasting tool grinder. Careful, fine workmanship has made "Luther" grinders a tradition in accuracy.

Luther TOOL GRINDERS

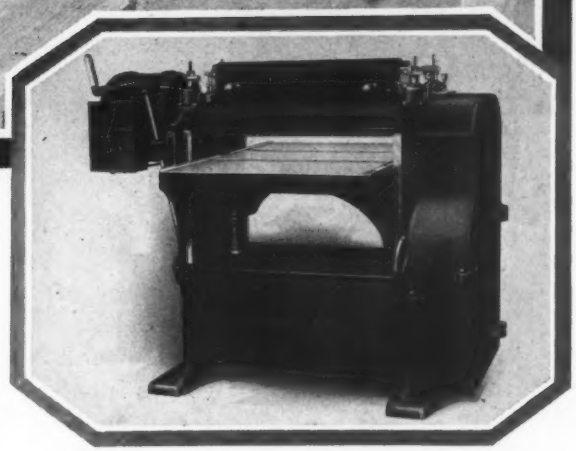
For over thirty years Luther has made quality grinders—the safest and fastest tool sharpeners made. Tools are given a keen, **accurate** edge in a fraction of the time needed on a grindstone, with no danger of drawing the temper.

Below is shown one of the many designs of Luther Grinders. Write for free catalog, illustrating others.

LUTHER GRINDER MFG. CO.

MILWAUKEE, WISCONSIN, U. S. A.

Mechanic's Special Type No. 17 Heaviest, strongest hand-power grinder made. 7 x 1¼ x 1 inch medium DIMO-GRIT sharpening wheel. Equipped also with Patented Chisel and Plane Bit Guide and Twist-Drill Sharpening Attachment. Foot power attachment, if desired.



"a remarkable tool"

According to Mr. Carlow of Carlow and Gilker, Los Angeles, Calif: "It handles the thinnest of veneers in a way that was an eye opener to my partner, Mr. Gilker, who is considered an expert in that line. We strongly recommend your planer for light work."

Mr. Carlow was referring to their "Oliver" No. 199 Single Surface Planer, which is shown in the cut above, installed in their shop. Photo shows the machine planing 2-inch White Pine Door Stock.

ATTENDING THE AMERICAN VOCATIONAL ASSN. CONVENTION IN LOS ANGELES?

Visit our Booth. Complete stock of machinery in Los Angeles and can show you many installations in Schools and Industries alike.

OLIVER MACHINERY COMPANY

Grand Rapids, Michigan

To Men Who Love Good Tools

STARRETT TOOLS

To you to whom it is a source of genuine pleasure and pride to own and work with truly fine tools let us once again pledge the integrity of workmanship and forty-eight years of accumulated skill, experience and resources that have earned for this organization its reputation as the World's Greatest Toolmakers.

We wish you one and all the merriest Christmas and most successful of all New Years.

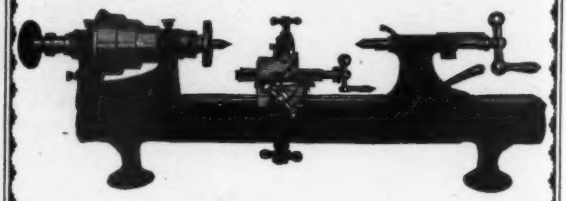
THE L. S. STARRETT CO.
ATHOL, MASS., U. S. A.

STARRETT TOOLS · STARRETT HACK SAWS CUT QUICKER LAST LONGER · STARRETT TAPES STANDARD FOR ACCURACY

1320

STARK BENCH LATHES AND PROGRESS

144.2 MILES PER HOUR



—a new record recently made by Frank Lockhart in his Miller car on a 1¼ mile track. Lockhart uses a completely equipped Stark Bench Lathe on a portable mounting for the maintenance of his remarkable cars and says that he "couldn't get along without it."

Built in six sizes for fine tool and experimental use, they are accurate enough for the most exacting work and have the ruggedness and simplicity required for school installation.

This first-class equipment will pay in the end and is worth your investigation.

STARK TOOL COMPANY
ESTABLISHED 1802 WALTHAM, MASS.
Originators of the American Bench Lathe.

Huther Bros. Dado Head

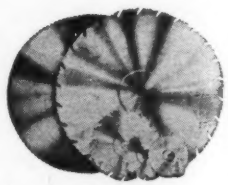
You need a Huther Dado Head

The saw that makes intricate cutting and grooving simple.

This saw, developed from our own patents, consists of two outside cutters and a sufficient quantity of inside ones to perform the required cut. The outside cutters can be used singly or in pairs as required.

Every builder or contractor, wishing lock corners or any sort of grooving, will find his production costs lowered by this saw.

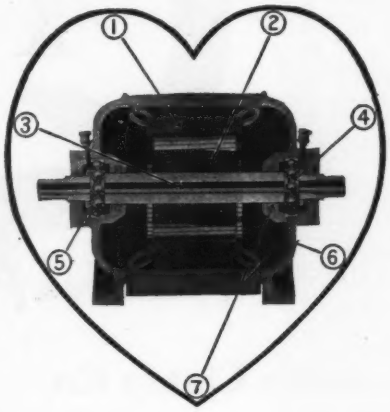
Write for complete information and prices, or send for one on approval. It may be returned at our expense if unsatisfactory.



Huther Bros. Hollow Ground Saw

HUTHER BROS. SAW MANUFACTURING COMPANY
Rochester, N. Y.
Makers of Better Saws for More Than 50 Years.

Into THE HEART of "Blount" Motor Headstock LATHES



is built those features which have been responsible for their wide popularity. They are the result of thirty-nine years of specialized attention and experience in lathe manufacture. They are your assurance of long years of satisfactory service in their use.

(1) Stator } **(2) Rotor** } The motor comprises but two parts, a rotor and stator of squirrel cage, 4-speed type — simplicity itself — no complicated device to cause expense or bother — speeds sufficient for all work. Constant speed throughout load with minimum current consumption.

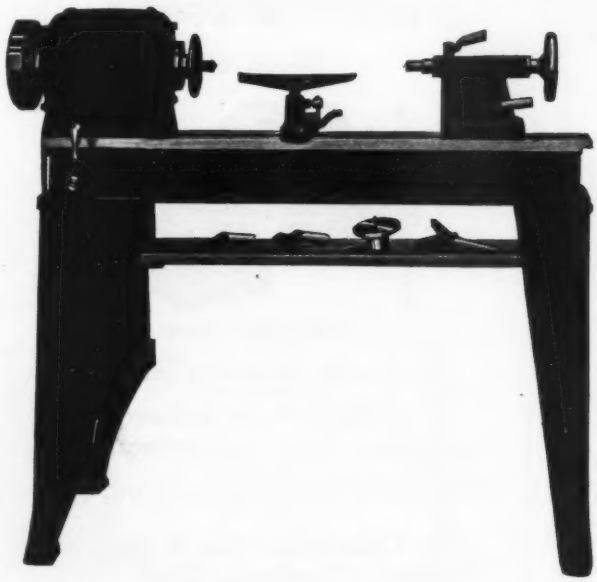
(3) Oversize Spindle for added load capacity — bored throughout 5/8" — fitted with Morse No. 2 large taper for larger centers to better hold the work.

(4) Heavy Duty Ball Bearings deep groove type—have increased load capacity — maintain lubrication better — more quiet and smoother running.

(5) Independent Bearing Mountings locknuts serve only to hold bearings rigidly in place — do not serve as shoulder for faceplate—hence no possibility of loosening bearing mountings and causing breakdown.

(6) Extra Heavy Motor Endshields for the added strength built all through this headstock—fully enclosed motor—dust proof and safe.

(7) Double Protection Against Dirt Extra felt packing at rear of bearings as well as front is added precaution against dirt — no chance for bearing wear.



The keynote of this design, simplicity and rugged strength, have also been carried to all other parts. The tailstock, the bed, the legs—all built to the same high standard. And, of course, with this simplicity goes ease and convenience in operation and complete safety.

You will want the complete details on these lathes in new descriptive bulletin which will be sent on request.

J. G. BLOUNT CO.
Everett Mass.

Get the Genuine

TRADE MARK

"Jorgensen"

REG U S PAT OFF

Peerless Adjustable

The Original Steel Spindle Handscrew.

Look for the Name

Steel Spindles

Steel Nuts

Maple Jaws

12 Sizes Adjustable 4" to 24"

10 Sizes Non-Adjustable

Write for our catalog No. 6-EE or ask your dealer.

IMPROVED— "MARK" CARRIAGE CLAMPS

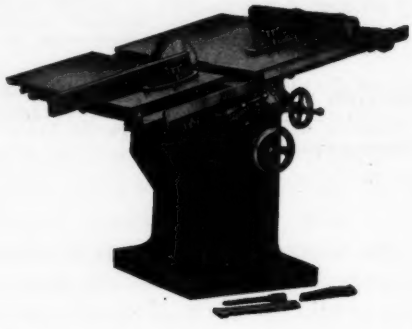
THESE Clamps, known to users for many years as the highest grade, are now made with full size COLD DRAWN STEEL SCREWS, which adds a great deal to the strength and accuracy of the screws and to the durability of the threads.

"MARK" MACHINISTS' CLAMP

This Clamp is of extra heavy design and will stand severe test. The frame is made of best malleable iron, and the screw with square head is cut from solid bar of cold drawn steel, with deep "Acme" type threads. The screw is provided with vise type handle and ball-and-socket swivel.

Adjustable Clamp Co.

424 N. Ashland Ave., Chicago, Ill.



The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self feed rip saw.

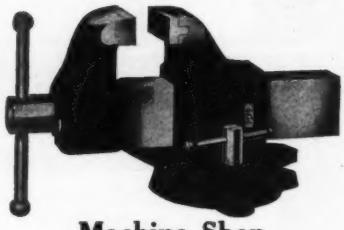
THE CRESCENT MACHINE CO.

25 Main St.,

LEETONIA, OHIO.

COLUMBIAN VISES

Wood Shop



Machine Shop

A vise for every need.

In Schools or Industry.

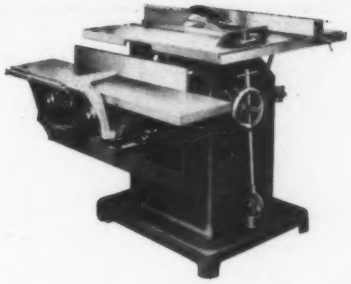
Columbian Vises standard equipment.

Will gladly send literature and prices.

The Columbian Vise & Mfg. Co.
Cleveland, Ohio

SPEED, AND ACCURACY AT LOW COST.
Gallmeyer & Livingston Motor on Arbor Universal Saw Bench. The greatest Saw built.

COMPACT, RUGGED, SPEEDY.
Gallmeyer & Livingston 20" Band Saw. It "cuts" down expenses, and speeds up production.



DOES THE WORK OF TWO MACHINES.
Gallmeyer & Livingston Combination Motor on Arbor Saw and 8" Jointer. "Cuts" labor costs, speeds production, saves floor space.

Speed Accuracy Low Cost for Schools

MAXIMUM SPEED, AND EFFICIENCY, AT MINIMUM COST

The new Gallmeyer & Livingston Motor on Arbor Eight Inch Hand Jointer can be supplied to operate from lighting current to power line. The motor on arbor construction provides THE MOST EFFICIENT AND POSITIVE DRIVE IT IS POSSIBLE TO OBTAIN—Eliminates belts, gears, and flexible couplings——Is portable—and has the most up-to-date equipment obtainable.

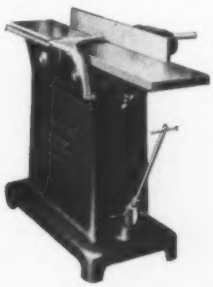
Write for complete details of Gallmeyer & Livingston Machines.

GALLMEYER & LIVINGSTON COMPANY

214 STRAIGHT AVE. **GRAND RAPIDS, MICHIGAN**

CUTS RISING COSTS.
Gallmeyer & Livingston Single Spindle Shaper. Like all Gallmeyer & Livingston machines it saves time, money, and floor space, and speeds up production.

CUTS COSTS IN MANY WAYS.
Gallmeyer & Livingston Combination Vertical Boring Machine and Hollow Chisel Mortiser Built for heavy duty—handles any job with greater precision.

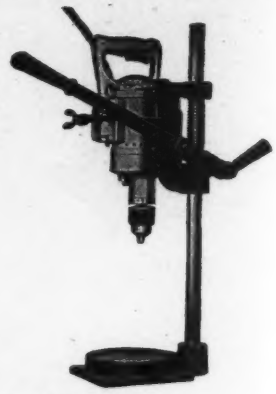


Gallmeyer & Livingston Motor on Arbor 8" Hand Jointer. Greater Speed and Accuracy—Less Cost.

"CLARK" Electrically Driven Tools

"first in the field"

The "Clark" line is comprised of a great number of portable and stationary devices, all electrically driven. Prominent amongst these are the Drills and Grinders illustrated here. The National acceptance and use of "Clark" tools have established them as standard equipment in all modern school shops.



Following is a Partial List of Schools Using "Clark" Drills and Grinders

Eastern State Normal School, Richmond, Ky.
Lawrence High School, Lawrence, Mass.
New East High School, Green Bay, Wis.
Independent School District of Va., Virginia, Minn.
Waukegan Township High School, Waukegan, Ill.
Theo. Roosevelt High School, St. Louis, Mo.
Rensselaer Polytechnic Institute, Troy, N. Y.
Roosevelt Junior High School, Philadelphia, Pa.
Harding Junior High School, Philadelphia, Pa.
Jones Junior High School, Philadelphia, Pa.
Sulzberger Junior High School, Philadelphia, Pa.
Tilden Junior High School, Philadelphia, Pa.
Thomas Junior High School, Philadelphia, Pa.
Northeast High School, Philadelphia, Pa.
Mitchell Junior High School, Philadelphia, Pa.
The Stout Institute, University of Wisconsin, Menominee, Wis.
Sheboygan Vocational Continuation School, Sheboygan, Wis.
Dupont Manual Training High School, Louisville, Ky.
McKinley Technical High School, Washington, D. C.
Murray Hill Vocational School, New York, N. Y.
Tilden Technical High School, Chicago, Ill.
Schurz High School, Chicago, Ill.
Lane Technical High School, Chicago, Ill.
Crane Technical High School, Chicago, Ill.
State Normal Schools, Stevens Point, Wis.
Albert Lea Public School, Albert Lea, Minn.
Board of Industrial Education, Kaukauna, Wis.
Manual Training High School, Brooklyn, N. Y.
Indiana State Normal School, Terre Haute, Ind.
Board of Education, Quincy, Ill.
McClurg Continuation School, Chicago, Ill.
Austin High School, Chicago, Ill.
Carnegie Institute of Technology, Pittsburgh, Pa.
Mesa Public Schools, Mesa, Arizona.
Wentworth Institute, Boston, Mass.
School Dist. No. 11, La Junta, Otero Co., Colo.
Theodore Ahrens Trade School, Louisville, Ky.
High Schools of Buffalo, N. Y.
Schools of New Rochelle, N. Y.
Lakewood School, Cleveland, Ohio.
Case School of Applied Science, Cleveland, Ohio.
Curtis Bay Junior High School, Baltimore, Md.
Southern Junior High, Baltimore, Md.
City Vocational School, Baltimore, Md.
Gwynne Falls Park Junior High School, Baltimore, Md.
Forest Park School, Baltimore, Md.
Clifton Park School, Baltimore, Md.
Schools of New York City, N. Y.
Junior High Schools, Louisville, Ky.

Los Angeles Distributor **KING-ZONNE COMPANY** 2226 South San Pedro St.

Ask for catalog No. 30 showing the complete line of "Clark" tools.

Jas. Clark, Jr., Electric Co., Inc.

630 E. Bergman St. Louisville, Ky.

No cutting tool is better than its edge
Keep the tools sharp

PLURALITY OILSTONE TOOL GRINDER

THE most convenient, serviceable and efficient tool sharpening machine ever made.

This new Tool Grinder has been carefully designed to combine many new advantages with the essential features of older models. It combines five basic units in one machine: *coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel,* and all accessible from two adjacent sides.

It is motor driven, ball bearing throughout, and every unit is thoroughly guarded.

Write for full descriptive bulletin.

MUMMERT-DIXON CO.
Hanover, Pa.
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

THE JOHNSON FRICTION CLUTCH

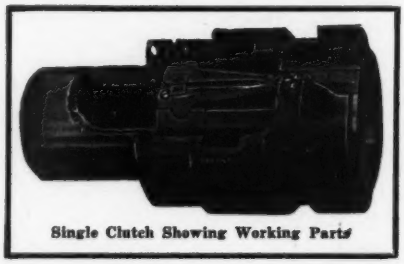
Experience Proves that

Johnson Clutches

are splendidly adapted

For Use in Schools

On lathes, band saws, and various other light-powered machines in manual training departments the JOHNSON Clutch gives admirable service. This clutch is in nation-wide use in public and private schools, and gives highest satisfaction wherever used.

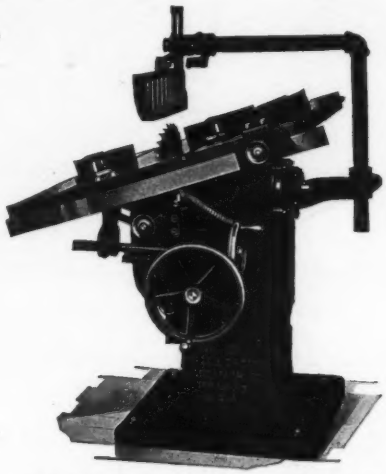


Single Clutch Showing Working Parts

For twenty-five years we have been supplying our clutches to the schools of America. This experience COUNTS. Anything a school needs in clutches—we have it. Thousands of illustrated 7 x 10 reprints describing installations. Equip with JOHNSONS.

Write for Catalog "IAM"

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER, CONN.



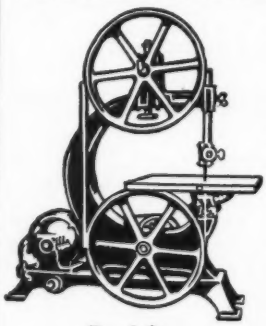
MOTOR ON ARBOR
No. 131
BALL BEARING VARIETY SAW

No. 131 is controlled by START and STOP push button. Table angles 45°. Carries 16″ Saw.

Write for descriptive bulletin IA-5

Hall & Brown Wood Working Machine Co.
Broadway, Tyler, Ninth Sts.
ST. LOUIS, MO.

Let ALL of Your Students Get Practical Machine Experience



Band Saw

THEY can do that, SAFELY, with H & A machines, and they will learn more by using a machine for a few minutes than by watching an instructor for hours. Let the students do the work with H & A machines. They can't hurt themselves or the equipment.

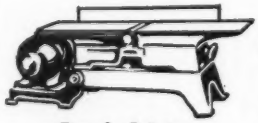
More Machines For Less Money

These are the same sturdy, dependable machines that are used in thousands of factories and woodworking shops for heavy eight hour continuous duty—yet their cost is surprisingly low. You can put in a whole battery of these machines for the cost of a single massive floor type machine. All electric, and portable; require little space. Operate from any lamp socket.

Rip Saw

Write for complete information and prices

HESTON & ANDERSON
312 Depot St., Fairfield, Ia.



Bench Jointer

Wood Lathe

SIDNEY

Lathes For Schools

In making up specifications for new equipment bear in mind Sidney's years of experience in designing and building Machine Tools. Sidney Engineers will go into your requirements, at no cost to you, and will make recommendations as to shop layout and the type of Tools best fitted to your special conditions.

We invite your correspondence.

Write for Catalogue.

The Sidney Machine Tool Co.
Sidney, Ohio

Steel Sheets that Resist Rust!

The destructive enemy of sheet metal is *rust.* It is successfully combated by the use of protective coatings, or by scientific alloying to resist corrosion. Well made steel with an alloy of Copper will last longest. Insist upon

KEYSTONE

Rust-Resisting Copper Steel

Black and Galvanized

Sheets

and Tin Plates

Keystone Copper Steel gives superior service for roofing, siding, gutters, spouting, culverts, tanks, and all forms of sheet metal work requiring highest rust-resistance. Send for *Facts* and other interesting booklets of value to shop instructors and craftsmen. We manufacture American Bessemer, American Open Hearth, and Keystone Copper Steel Sheets and Tin Plates for every use to which sheet metal is adapted—in industrial fields, in sheet metal shops, and for all lines of remanufacture.

Black Sheets for all purposes
Keystone Copper Steel Sheets
Apollo Best Bloom Galvanized Sheets
Apollo-Keystone Galvanized Sheets
Culvert, Flume, and Tank Stock
Formed Roofing and Siding Products
Automobile Sheets, Deep Drawing Sheets
Roofing Tin Plates—all grades
Bright Tin Plates, Black Plate, Etc.

Our Sheet and Tin Mill Products represent the highest standards of quality and utility, and are particularly suited to the requirements of the industrial shop, and the particular sheet metal worker. Sold by leading metal merchants and distributors.

American Sheet and Tin Plate Company

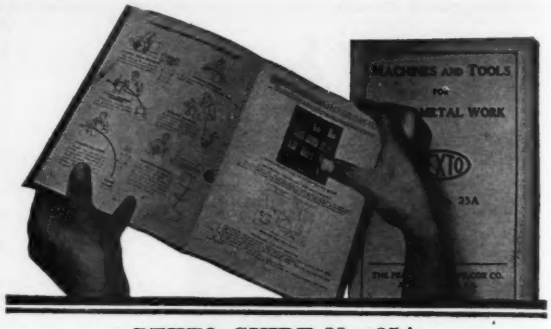
General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS CO., San Francisco Los Angeles Portland Seattle

Export Representatives: UNITED STATES STEEL PRODUCTS CO., New York City



PEXTO GUIDE No. 25A

Free for the Asking—

SHEET METAL WORK—as an Industry—its Value as a timely Industrial Vocation for School Shops — the Projects — Aims of the Course — Sheet Metal Working Machinery — Application, and other things you would like to know are fully covered.

THE PECK, STOW & WILCOX CO.
Southington, Conn., U. S. A.

When You Think of Supplies

For Your Sheet Metal Working Course

THINK OF

BERGER BROS. CO.

You don't have to shop around when you buy of us. We carry everything from a rivet to the largest machine used for this work.

Ask Any Sheet Metal Worker

If you are not equipped to teach this course you should investigate. The sheet metal industries need skilled labor and need it bad. The work is healthful, the hours short, and the wages high. Let us send you literature on the subject.

DISTRIBUTORS FOR

PECK, STOW & WILCOX CO.'S
Line of Tools and Machines

BERGER BROS. CO.
229-231-233-235-237 Arch St.
PHILADELPHIA

Less effort—yet, better standards

SURELY every teacher takes pride in watching a class progress to a high marking average. It is surprising to note how Kester Solder will enable a group of boys to do soldering that will compare with the work of a skilled mechanic.

Kester, by eliminating the acid pot, eliminates the uncertainty of soldering. A scientific flux inside this hollow wire of solder flows to the job as heat is applied. Immediately after, the bright solder melts and forms a bond, neatly, subtantially and quickly.

Send for samples of Kester and see the renewed interest your boys will take in their soldering projects.

KESTER *Self-Fluxing* SOLDER

[Trade Mark]

Kester Acid-Core Solder
1, 5, 10 and 20-lb. Spools
For General Work

CHICAGO SOLDER COMPANY, 4259 Wrightwood Ave., Chicago, Ill.
Gentlemen: Please send the following number of working samples:

.....Kester Acid Core Wire Solder .....Kester Rosin Core Wire Solder

The number of boys in our shops are: General Shop..... Electrical.....
Sheet Metal ..... Home Mechanics.....

Signed.....

Instructor in..... School.....

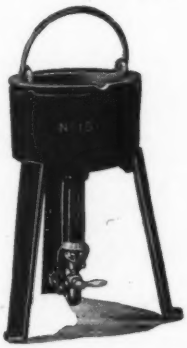
City..... State.....

Kester Rosin-Core Solder
1, 5 and 10-lb. Spools
For delicate Electrical Work

A New Johnson Furnace!

No. 15

Lead Melting Furnace



This is the quickest lead-melting furnace made. Will melt its capacity of lead in less than 10 minutes. Economical in operation. Built to withstand hardest usage. Especially designed for Battery Stations, Plumbers' Shops, Garages, etc., where small quantities of metal are used. Equipped with one powerful Johnson Patented Direct Jet Bunsen Burner with shut-off valve and pilot light. No blower needed.

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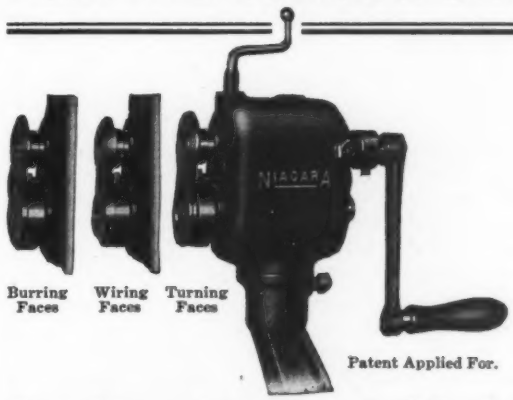

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Ball-bearings throughout mean easy running, durability, and simpler lubrication. All units are carefully guarded, an important point to watch in selecting manual training machines.

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WOODWORKING MACHINERY

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A Lux 3 Speed Portable lathe is like a trained athlete, ***carrying no extra weight or bulk, but right there with the power and speed and naturally with a larger capacity for work.*** Safer, quicker, and with a larger capacity than any other multiple speed lathe selling within $100 of the same price.

Ask about our larger lathes.

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22 East Hennepin Avenue
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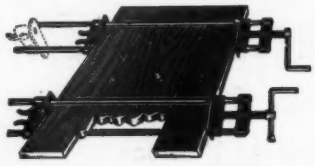
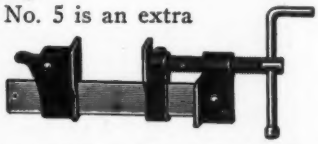
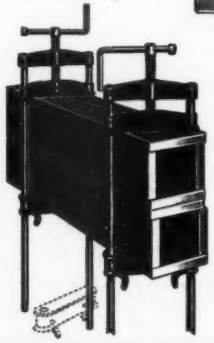


All our clamps are made of the best iron and steel obtainable. This permits of greater pressure on work and assures you of lasting dependability.

Hartford No. 3 Double Bar Clamps are of the self-locking and unlocking type. Easily and quickly adjusted, they maintain uniform pressure on both sides and thus prevent the work from buckling.

The Hartford No. 5 is an extra strong, medium weight, Single Bar Clamp.





With our No. 6 Double Bar Clamps being used in the school shop for gluing posts, chair arms, etc., presses are eliminated. These clamps handle any work up to 6½" in thickness. Also mitre clamps.

Further particulars in our catalog No. 10. Send for it.

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The Perfect Bench Lathe For School Shops

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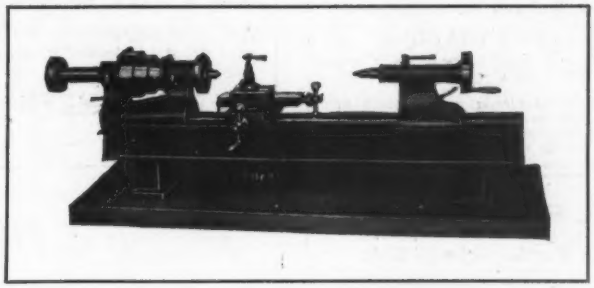
A larger class can be taught simultaneously because of the small space occupied by the bench lathe.

Because of the low cost of each unit, a lathe can be installed for each student in the class.



All of the elementary principles together with a large amount of advance work can be taught and practiced just as well on this bench lathe as on a larger, more expensive tool.

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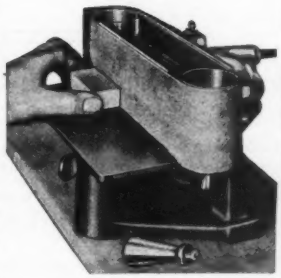
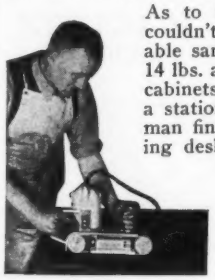
THE BENCH STAND becomes a very useful and handy edge sander or tool grinder for schools. The BENCH STAND illustrated on the left is a strong cast iron supporting frame into which the TAKE-ABOUT fits when turned on its side allowing the belt to run free. With this device, burrs and surplus stock on small wood or metal parts can be removed.





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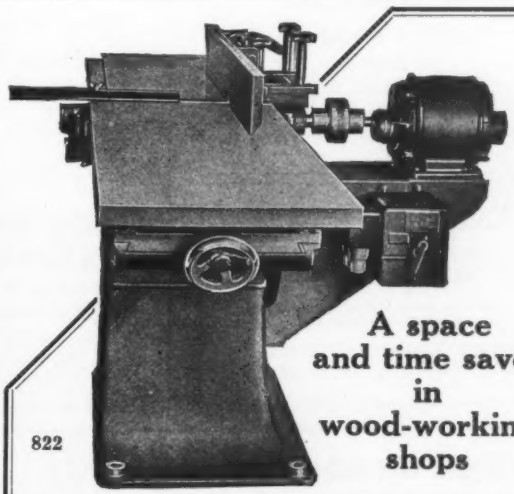

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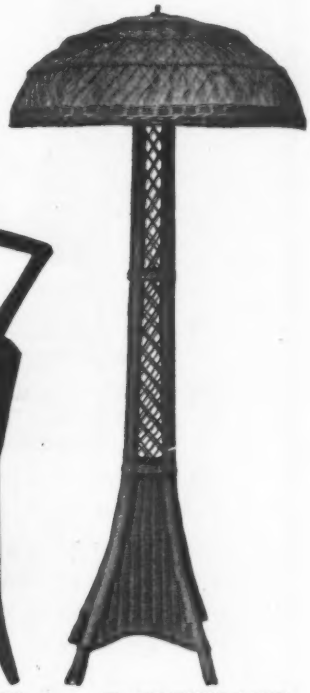

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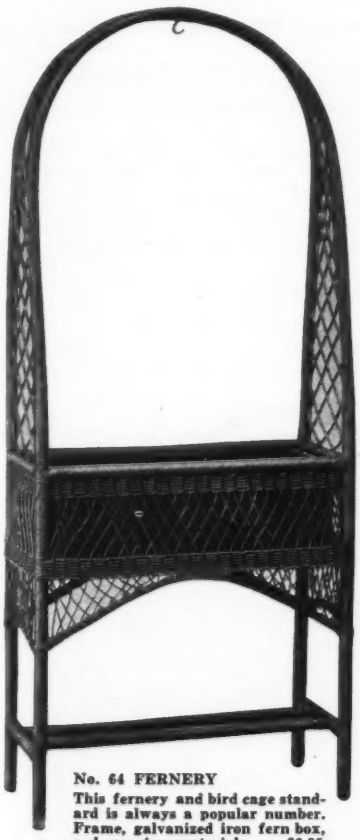

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A better and quicker way is the attractive wood block or linoleum print. This may be had printed onto the cards, or for little cost, when very many cards are desired, taken to your local printer for printing.

Hand paint in spaces with ordinary water colors mixed with white tempera paint, or all with tempera colors, if you have them. It is not necessary to painstakingly run your color directly up to the printed lines. In fact there is a certain grace gained by a free filling in: A dull violet, blue, or blue-green sky; white snowman, snow on ground, roof, also on ledges over windows and door; yellow and orange in windows; blue or green door. A dark blue ink is nicest for printing.

Unquestionably the combination of construction paper torn edge cards in Butterfly paper envelopes is the latest thing this season,—Butterfly papers that display one lovely color on the outside of the envelope and another color on the inside.

Get out your paper catalogs of these two papers and make your selection. The following are suggestions that have proven exceptionally fine. Butterfly paper numbers represent color for outside of envelopes.

Construction Paper Cards No.	Butterfly Paper Envelopes No.
1	4B
8	8A
9	8B
10	3B
11	3B
12	7B
14	2B
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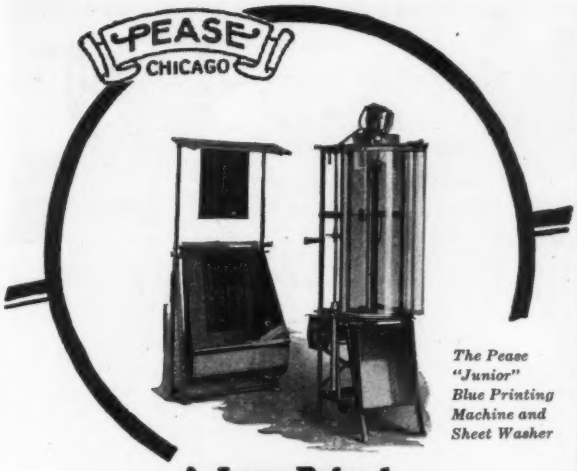

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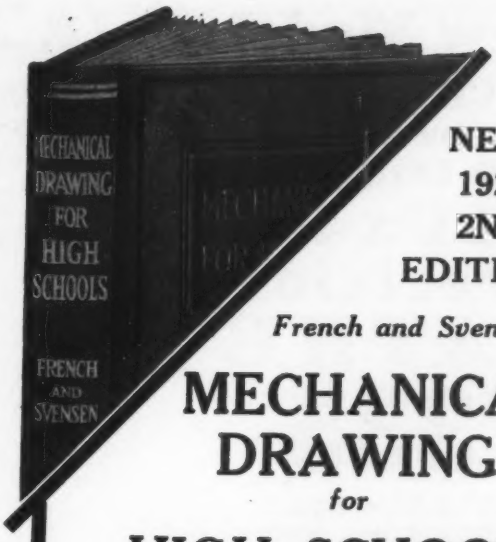

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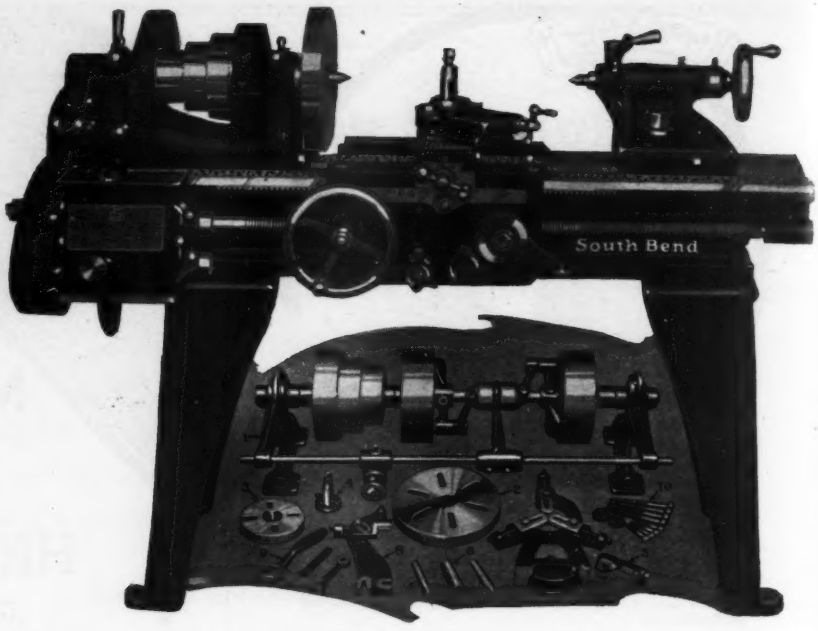

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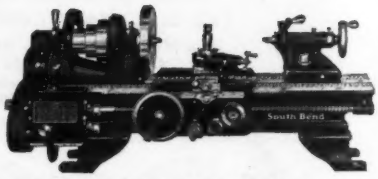

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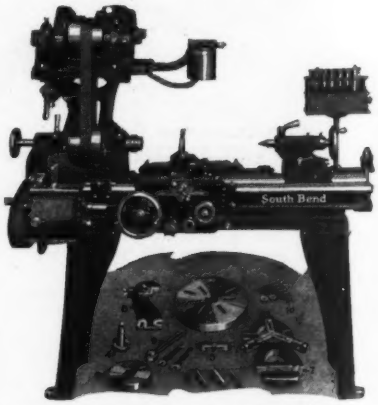

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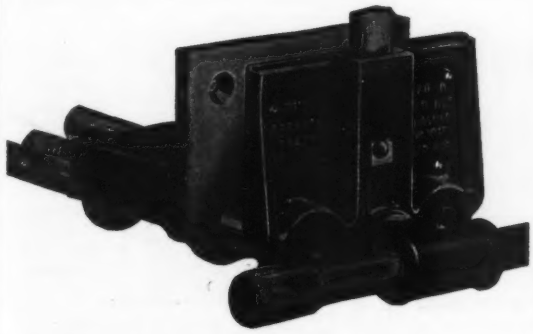

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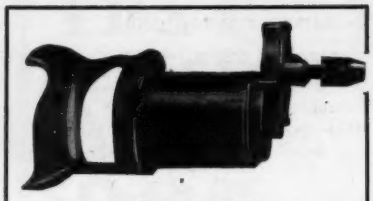

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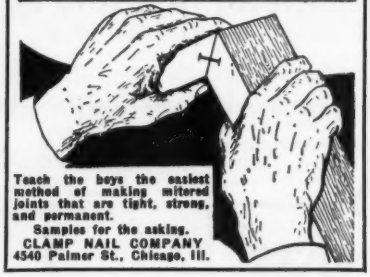

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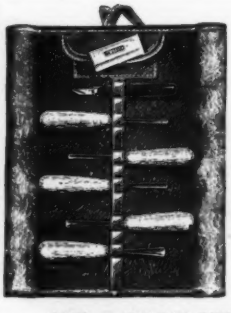

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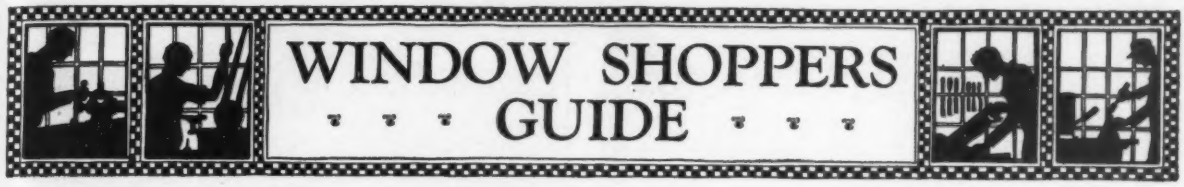

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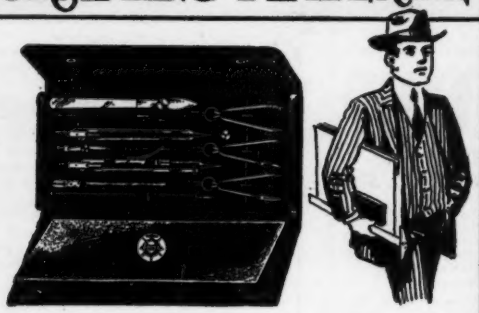

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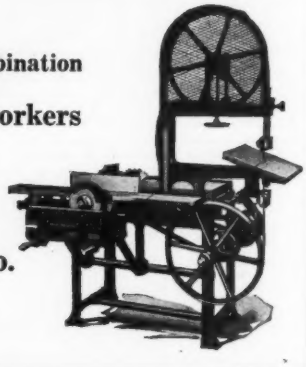

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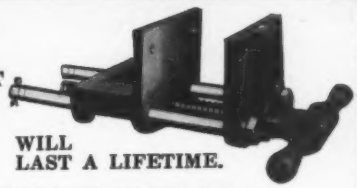

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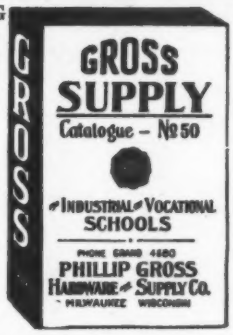

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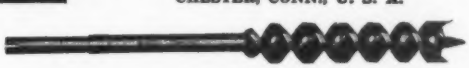

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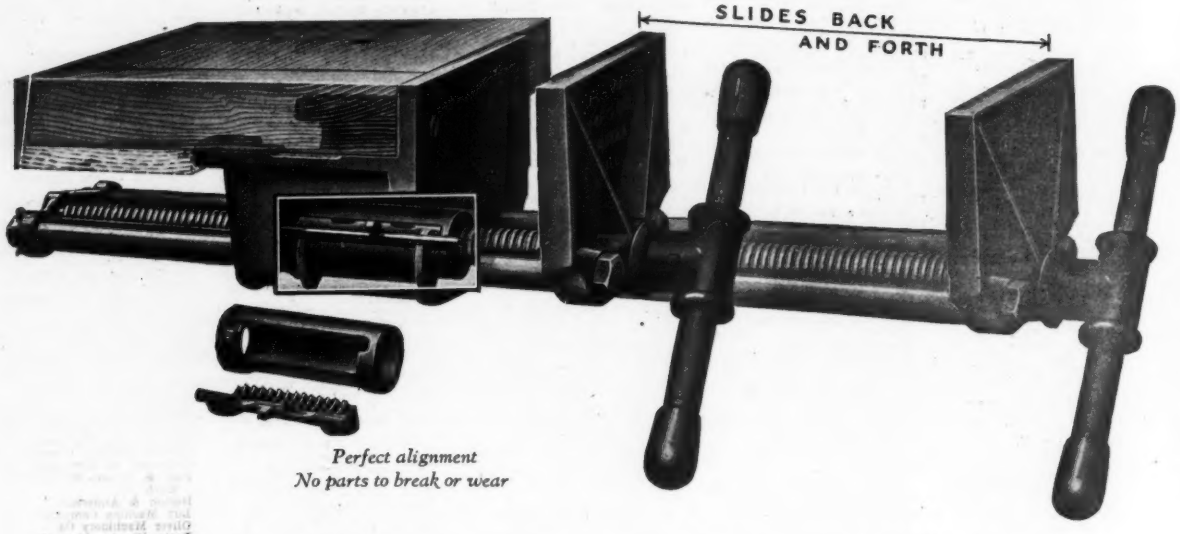

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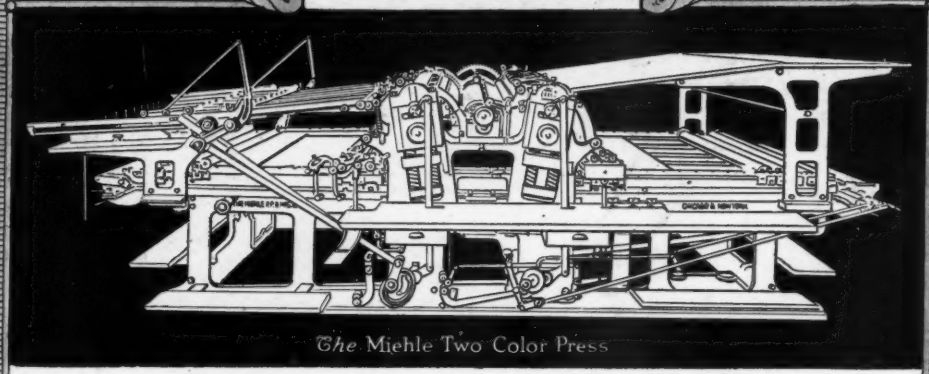

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